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PAPER TRADE JOURNAL

Vol. XCVII OCTOBER 12, 1933 No. 15

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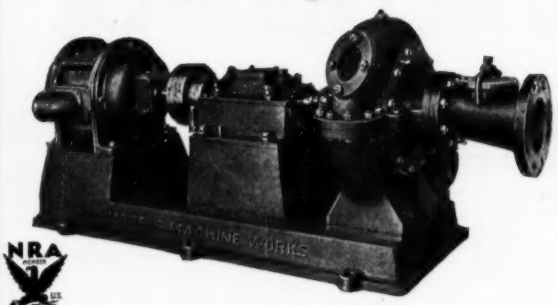
No clogging interruptions



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PAPER TRADE JOURNAL

ESTABLISHED 1872

SIXTY-SECOND YEAR

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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PAPER TRADE JOURNAL

With Which Is Combined

PAPER

Vol. XCVII, No. 15 Thursday, October 12, 1933

National Paper Trade Association Convenes

More Than Two Hundred Paper Merchants From Different Sections of Country Attend Annual Fall Meeting in Chicago—Code of Fair Competition for Paper and Twine Distributors Freely Discussed—Methods of Carrying Out Provisions Thrashed Out by Various Groups—Those in Attendance Express Optimism Over Future

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 7, 1933—Finding much difficulty in moving forward because of the immense crowd of Legionaires in Chicago during the week, the National Paper Trade Association nevertheless overcame this handicap and went ahead to complete a most successful meeting at the Hotel Stevens, Chicago, October 3 to 6. Attendance was exceptionally good, well over 200 having registered by October 4 and many more in attendance that didn't get on the official roster, particularly Chicagoans who popped in and out of convention headquarters with much regularity. Executives were present from all over the country, drawn, doubtless, by the code perplexities confronting the association and the industry as a unit.

It was, in reality, a "code meeting." The forepart of the four day session was spent in a presentation of the Code of Fair Competition for the Paper and Twine distributing trade, virtually as it was presented at Washington earlier in the month. The remainder of the four day program was given over to thorough group discussions of code provisions, of methods of carrying out these provisions. While the hours of labor provisions came in for much discussion it was the statistics and reports feature of the paper code that created much debate. The matter of trade practices, always foremost in the program of the association, was more familiar but none the less important.

Amendments to Code Studied

The association also carefully studied the amendments to the code which were also presented to the Administration as a part of the code proper. The great bulk of the amendments pertained to the schedule of hours including work periods for maintenance and service employees; firemen and janitors; watchmen, etc.

The week's work was pried open on the afternoon of Tuesday, October 3, when the Board of Directors met to outline the procedure of the meeting, particularly as applied to the code and code discussions. During the evening the Western Paper Merchants Association was host to a dinner meeting at the Union League Club. On the following morning, October 4, the Survey Committee, with R. M. Beckwith as chairman, opened the actual business sessions, followed closely by a general meeting, with President S. L. Wellhouse presiding. It was at this session that a thorough explanation of the Code was provided, an explanation that carried on into an afternoon session interspersed with the reports of the board of directors, the treasurer, and the executive secretary, Arthur Chamberlain.

On the evening of October 4 the Fine Paper and Gummed Tape groups held meetings, L. H. Young presiding over the latter session. Later in the evening the Uniform Cost Accounting Forum was held. Thursday morning W. N. Gillett, chairman, called together the Special Survey Committee. All throughout the day group meetings were held and at each the subject of the Code of Fair Practices was applied to each group. These contact sub-committees and their chairman were as follows: Writing, R. S. Bull; Book, C. W. Lewis; Covers and Text, W. W. White; Envelopes, J. D. Swigart; Cardboards, bristols and blottings, D. W. Pratt; Seconds and job lots, A. T. Bermingham; converter and direct selling, R. S. Bull. The meetings of these groups comprising the fine paper division were matched in the wrapping paper division by the following: Tissue and Allied Products, F. B. Tracy; Twine, G. W. T. Skinner; Bags, J. S. Danehy; Wrapping Paper (Kraft), Leo S. Altholz; Specialties (cups, containers, pails, cartons, dishes, etc.), A. D. Riley.

The executive committees of both the Fine and Wrapping Paper Divisions met in the evening to solidify the suggestions and criticisms made in the various groups throughout the day.

Survey Committee Reports

On Friday morning, October 6, Vice President A. W. Leslie opened a Fine Paper Division meeting which consolidated all the work done during the week, and which heard the reports of various manufacturers' contact committees. Mr. Leslie outlined developments in the paper industry with special emphasis on the importance of the Code of Trade Practices and with a keen insight into the present and future problems of the industry. W. N. Gillett reported on the work of the Special Survey committee at the completion of Mr. Leslie's remarks. Reports of the various contact committees who had held meetings on the previous day were also given, the chairmen of each being responsible for reports covering activities. An open forum followed—a general discussion indicating the pro-

(Continued on page 22)

Price Bros. Reorganization Plans Approved

R. O. Sweezey and John Stadler, Prominent Canadian Pulp and Paper Mill Engineers, Associated With Bowater's Paper Mills, of London, England, in Accepted Plan—Opinion Expressed That Deal May Have Important Effect on Whole News Print Paper Industry

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 9, 1933—While announcement of the plan decided upon for the reorganization of Price Bros. & Co. is still lacking in details, it has now been disclosed that R. O. Sweezey and John Stadler, who have long been prominent in the Canadian pulp and paper industry, are associated with Bowater's Paper Mills, of London, England, in the plan which has been accepted by the Protective Committee for the bondholders of the Price concern. R. O. Sweezey had built up a reputation as a forest engineer before he became the main figure in bringing about the giant Beauharnois power development on the St. Lawrence river near Montreal. John Stadler was for many years with Biermans in the operation of the Belgo mill, and was later identified with the construction of the Corner Brook and Dolbeau news print mills. Others who we reported to be associated with the accepted plan include Victor Drury, investment banker and president of the E. B. Eddy Company; Harry Oakes, of Lake Shore Gold Mines fame; and D. I. MacLeod, Toronto investment broker.

The action of the Protective Committee in accepting the Bowater plan does not carry with it immediate control of the property. Approval must be given by the bondholders, stockholders, creditors and others. Under the terms of the agreement, it is understood, total of $5,000,000 in cash will be put up behind the bonds, with provision made for a further $1,000,000 to be subscribed, as and when required.

Of the $5,000,000 in cash, it is indicated that Bowater's Paper Mills will be responsible for a little under $4,000,000, while they will also be responsible for the sixth million above referred to. The remaining amount would be advanced by the Canadian syndicate who will have a participation.

Eric V. Bowater, chairman and managing director of Bowater's Paper Mills, remarked in an interview here after the Protective Committee had announced acceptance of the plan that should the plan be finally approved and carried it was the intention of his company that Price retain its Canadian character and have on its board a group of representative Canadians, but added at the same time that in the light of the substantial cash investment which they were prepared to make it was only natural that control must be fully held by Bowaters.

Underwriting the Price Plan

As showing the underlying faith in the news print industry, the following incidents related by the *Financial Times*, of Montreal, in connection with the acceptance of the Bowater plan for the reorganization of Price Brothers are illuminative:

"One of the most interesting developments in connection with the Price Brothers deal was the success that attended the underwriting of over $3,000,000 in connection with the reorganization plan. This was no ordinary underwriting, where subscribers took a commitment afterwards financed by a bank. Instead, every subscriber to the syndicate had to undertake to put up the full amount subscribed for. This was a most unusual procedure, and one it was thought would make the deal very difficult, especially under the conditions that prevailed. In tackling the deal Bob Sweezey had the assistance of some good lieutenants, as some of the latter were responsible for a very large percentage of the subscriptions. When the deal was first put forward it was stated that the subscriptions included one for a million dollars from a prominent mining man, and one for half a million from a Montreal capitalist, well known on the local Street. This, however, left over a million and a half still to be made up in various amounts, and when finally completed the list had a formidable array of subscriptions for $50,000 or $100,000, all of which indicated there were a lot of people who had very comfortable balances in the bank, and were in a position to readily look after their commitments. This alone showed that conditions were very much better in the country, as it is generally admitted that a year ago it would have been absolutely impossible to have achieved anything of the kind. In addition it is believed on the Street that the Price Brothers deal is going to have a wonderful effect on the whole paper industry, and that it is altogether probable it will mark the turning point to better things for the shareholders in many different paper companies."

Situation Improves in British Columbia

Optimistic reports regarding increased activity in the pulp and paper business, and in the allied lumber business, come from Vancouver, B. C.

Lawrence Killam, president of the British Columbia Pulp and Paper Company, reports a general improvement in the pulp situation on the coast, despite the continued low price level. Both the Woodfibre and Port Alice plants have been operated full time all this year. The spot market for pulp has moved into higher ground, but most of the company's business is on a contract basis. Increased demand is expected to bring a gradual rise in prices. Most of the British Columbia Pulp and Paper Company's production goes to the Orient, although a considerable proportion goes to the United States and even Europe. As a result of the improved condition of the company's affairs first interest payments under the amended financing plans will be made on October 16.

Increase in Woods Operations

From St. John, N. B., it is reported that the season's cut of pulpwood in New Brunswick which, it is estimated, will run into some 100,000 cords on Crown and granted lands, has been about completed and shipping will be the next aspect with the most of it to be moved by water. The exceptionally dry weather which prevailed in New Brunswick for about a month and a half curtailed the pulpwood peeling season by some two weeks, or so, the dryness causing the bark to tighten earlier than before. There is, however, some prospect of pulpwood operations continuing during the winter, depending largely on the price and demand. So far as it can be estimated the cut this season will be about double that of 1932 and in pulpwood operations, in general, the season has been one of the most active in recent years.

From Quebec it is reported that the Temiscaming Paper Company, subsidiary of the International Paper Company, will cut about 70,000,000 feet of timber in the valleys of the Kinojevis and Ottawa rivers, it is learned here. As

already announced the total cut by companies in the province this winter is expected to exceed 600,000,000 board feet.

Quick Repairs in Paper Mill

An interesting example of modern methods in effecting rush repairs in a paper mill is supplied by Nova Scotia. On a recent Friday the Canadian Westinghouse Company at Hamilton received a telephone call informing them that a 3000 KVA transformer at the Mersey Paper Company's mill at Liverpool, N. S., had suffered damage from lightning, and that the utmost speed in service was necessary. In order to catch the evening train from Montreal, a Westinghouse transformer expert flew from Hamilton in a plane furnished by the Hamilton Aero Club and piloted by Sam Foley, the flight being accomplished in 3¼ hours. The necessary replacement coils were ordered by telephone. The best possible delivery that the Canadian Westinghouse Company could promise was the following Wednesday. The work was started on Saturday and, continuing through Sunday, with splendid work by the shop, was actually ready for shipment on Monday—two days before promised delivery. This was also made possible by the co-operation of the Eugene Phillips Electrical Works, Ltd., who had to draw and insulate a quantity of copper wire required for these coils. The coils were shipped by express and this replacement, which normally would have taken ten days, was completed in under half that time, resulting in considerable saving of time in making repairs.

Carthage Paper Makers Busy

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., October 7, 1933—Improved conditions are reported from the newly organized Carthage Paper Makers, Inc., and announcement was made this week that plans are under way for greatly enlarging the productive capacity which will incidentally furnish employment to about 50 more men. Plans also call for the placing in operation of the largest of the two machines at the plant. It was announced that the increased operations are the result entirely of the success of the business since opening and also greatly increased demands for products. The firm produces cardboard and heavy paper almost exclusively and only a single machine has been operated since the plant re-opened as an experiment. Since last fall the machine has averaged about 25 tons per day and the placing in operation of the other machine will give the plant a daily output of over 50 tons.

Only recently there were rumors regarding the sale of the plant to a new concern because of the taxes due on the property. The delinquent taxes, however, were paid by the bonding house of Stroud & Co., late in August, which holds the controlling interests in the Carthage Pulp and Board Company, from whom the plant was leased. It was also stated that the firm will continue to operate under the lease obtained from the Carthage Pulp and Board Company. From now on methods will be used in the handling of raw material, etc., so as to permit greatly enlarged production at the plant.

Assembly work on the larger machine has already been started under the direction of the plant superintendent and it will be placed in use within a short time. It is planned to make virtually the same kind of paper as the smaller machine with possibly some runs of a slightly heavier product. The Carthage Paper Makers, Inc., were started last fall as a co-operative venture and much of the success has been attributed to the response for stock subscriptions from local business men.

Code Hearings

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 11, 1933—A public hearing on a code of fair competition for the set up paper box manufacturing industry was conducted at the Mayflower hotel October 3 by Deputy Administrator W. W. Pickard.

A proposed code was presented by William T. Datz, Jr., president of the National Paper Box Manufacturers Association. It provides for an average work week of 40 hours, with 48 allowed in rush periods, and minimum wages for common factory labor of 32½ cents an hour in the North and 30 cents an hour in the South, and for other ordinary employes $13 a week in the North and $12 a week in the South.

In a supporting statement, L. E. Mosier, of St. Louis, said the industry was comprised of 800 plants having an aggregate of 28,000 employes, and represented a total investment of $30,000,000 with annual sales of about $52,000,000. He said a survey indicated the industry would add 4,200 workers under permanent code operations.

At the public hearing on the proposed Code of Fair Competition for the Stationery, Tablet and School Paper Manufacturing Industry held in the Palm Room of the Willard Hotel, labor spokesmen declared that this industry properly belongs in the Graphic Arts group and should come under the basic code now being worked out for that group. Deputy Administrator W. W. Pickard, who presided, expressed surprise that this question was raised. Had any intimation come to him before the hearing that this code should be combined with the graphic arts codes, he said he would have gone over the matter carefully with Deputy Administrator Lindsay Rogers, who has jurisdiction over codes submitted by various graphic arts groups.

The question concerning a possible conflict of jurisdiction did not arise until after W. W. Sunderland, president of the Stationery, Tablet and School Paper Manufacturers Association had formerly presented the code and gone over its provisions in detail.

In presenting the code Mr. Sunderland stated that the combined capital invested in the plants of the industry is more than twenty million dollars and the normal annual sales value of products in excess of forty million dollars. Approximately 7,000 wage earners are normally employed in the industry, he said, about one-half of them male and the other half female.

Data presented by Mr. Sunderland shows that this industry has suffered like most others during the depression. Statistics compiled for ten companies indicate that in 1928 the volume sales aggregated $26,356,000, giving a net return approximately $1,304,000. The same company in 1932 did a business of $16,000,000, a drop of 47 per cent in dollar sales, representing an average loss of 5 per cent on sales value. In actual pounds or reams of paper, the volume in 1932 was estimated to have dropped 20 per cent.

The National Recovery Administration has announced that on Saturday, October 21, in the Willard Hotel, a hearing will be conducted on the code of the wax paper industry, as represented by the American Wax Paper Association, claiming to represent 83.43 per cent of the total volume of the industry. Deputy Administrator W. W. Pickard will conduct the hearing.

Artcote Papers Opens Chicago Office

Artcote Papers, Inc., of Irvington, N. J., manufacturers of non-tarnishing and rubproof gold, silver and copper metallic papers, announce the opening of their Midwestern sales office, located at 1103 Merchandise Mart, Chicago, Ill., where a stock of the more popular numbers will be carried.

Activities of Fox River Valley Paper Mills

Atlas Plant of Kimberly-Clark Corp. Reports Capacity Operations—Riverside Paper Corp. Enjoys Steady Increase of Orders, Despite Unsettled Conditions—Now Operating at Near Capacity—Interlake Pulp & Paper Co. Maintains Schedule

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., October 9, 1933—Reports of declining production schedules have been received from a few mills in Wisconsin, yet the general trend is satisfactory, and capacity operations are continuing in a great many plants. One of the large converting mills is back on a three-day schedule per week, after having had a capacity run in the late summer period.

This slump is not regarded seriously, however. It was anticipated, in fact, because of the manner in which jobbers and customers were stocking up to protect themselves against advances in price. The buying rush was abnormal and once the warehouses were stocked a reaction was regarded as a certainty. The caution formerly exercised by jobbers in their buying to keep just ahead of demand vanished, and they were found to be stocking up heavily.

It is believed by manufacturers now that buying will return to its normal status once the codes are in effect and a greater market stability is demonstrated by reason of an assured unity of prices. The present slump is expected to continue until the heavy stocks decline, but a slow and steady improvement is believed to be in store within the coming months.

Capacity operations are reported by the Atlas mill of the Kimberly-Clark Corporation at Appleton, Wis. The mill is confined to wall paper printing on stock manufactured at the Lakeview mill at Neenah, Wis. Stock is now being prepared for the spring demand. Another 12-color press was recently installed, replacing a 6-color machine. The plant now has eleven wall paper presses in operation.

Despite unsettled market conditions, Riverside Paper Corporation, Appleton, Wis., has had a steady increase of orders since June and is now operating at 80 per cent of normal capacity. The company has experienced a heavy seasonal demand and is now employing 160 persons, an increase of twenty over the normal crew.

The Interlake Pulp and Paper Company division of the Consolidated Water Power and Paper Company at Appleton, Wis., likewise is operating at about 80 per cent of capacity. This record has been maintained steadily throughout the depression. Under the 6-hour shift plan, the number of employees is now 260, an increase of 65 over normal.

New Boiler for Rhinelander Mill

In order to meet the demand for increasing power, the Rhinelander Paper Company, Rhinelander, Wis., is installing a new Babcock & Wilcox boiler capable of 834 h.p. It will be stoker fired. The company also has started construction of an addition to the mill to provide added storage and installing of equipment to machine supercalendar rolls. A new roof has been completed on one of the main machine rooms. Approximately $150,000 is being spent for the improvements.

Bright Outlook for Masonite

Prospects for increased business were reported at the annual meeting of stockholders of the Masonite Corporation, held last week at Wausau, Wis. In summarizing the business of the last year, James P. Gillies, Chicago, executive vice president, declared each month near the close of the fiscal year showed increases in orders. During August, the Prestwood plant at Laurel, Miss., manufactured 16,000,000 feet of insulation and prestwood, a record output.

The corporation plans to enter into agreements with the principal manufacturers of wall board to manufacture prestwood for those companies or to license the companies to make their own products.

All of the directors were re-elected. They are: Ben Alexander, president; C. C. Yawkey, A. P. Woodson, D. C. Everest and M. P. McCullough, of Wausau, Wis., W. H. Mason, James P. Gillies and C. H. Worcester, of Chicago, and D. J. Winton, Jr., of Minneapolis. Officers will be elected at an adjourned meeting later.

Appleton Woolen Mills Improvements

Approximately $75,000 will be spent by Appleton Woolen Mills, Appleton, Wis., in improvements at its plant, according to F. J. Harwood, president. The work is being done by the company itself, with Frank Bennett, of Saulte Ste. Marie, Mich., as construction superintendent. Orbison & Orbison, Appleton, have the engineering contracts.

The addition to the main mill of a four-story unit replaces the present warehouse, which has been moved to another part of the property to be used for storage. The addition is of concrete fireproof construction, and is 136 by 56 feet in size. It adjoins the main mill. Two floors will be used for storage purposes, and the remainder for expansion of manufacturing space. The building will cost about $50,000.

Reconstruction of the power plant, now nearing completion, includes installation of a new water wheel, capable of greater efficiency with the same amount of water used as formerly. The wheel pit has been renovated, the tail race lowered about three feet, and the entire unit relined with reinforced concrete. The work will cost about $25,000.

The number of employees on the company's payroll has been increased from 71 to 122.

News of the Industry

Two warehouses at the Telulah mill of the Fox River Paper Company, Appleton, Wis., were damaged by a fire recently, with an estimated loss of $35,000. The buildings were filled with rags, paper and sulphite, much of which was ruined. Remodeling of both buildings will be started at once. They were of frame construction and covered with sheet metal. Mill operations were not interfered with.

Request for $3,000,000 of Federal forestry funds for reforestation work in Wisconsin has been filed in Washington by the Wisconsin Conservation Commission. The aim is to place 35,000 men at work in tree planting, removal of slashings, construction of roads and improvement of fire prevention conditions. In 1932, the state spent $500,000 on this work, giving employment to 12,790 men.

Department heads and mill council members of all the Kimberly-Clark Corporation, about 100 in number, met at the home office at Neenah, Wis., last week to go over plans for future operations.

Burial took place at Menasha, Wis., last week of A. V. Richardson, of Gary, Ind., 84 years old. He formerly was an executive of the Gilbert Paper Company, of Menasha. He left Menasha about fifteen years ago.

Paper Demand Comparatively Quiet in Boston

Various Grades of Fine Paper More Buoyant, In Some Instances—Improvement Noticed In Request for Fancy Papers—Kraft Wrapping Paper Section Dull—Box Board Business Fairly Satisfactory—Paper Stock Market Weaker Than of Late

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 9, 1933—Hardly more than a fair degree of activity prevailed in the wholesale paper market here during the week. With perhaps a few exceptions, business was rather draggy, largely due, it is felt, to uncertainty in regard to the codes and the general financial situation. While the trade is somewhat unsettled "psychologically," there is plenty of optimism that the latter part of the month will show a greater volume of orders. At the office of one prominent manufacturer of fine paper, it was stated that business was a little better during the week. Special campaigns on a number of grades continue. Wrapping paper was rather quiet, although prices were well sustained. The same condition was true of specialties. The demand for box coverings kept up to a considerable degree, with the needs for fancy papers for holiday purposes. The call for box board was fair. Board prices continued firm.

Manufacturers bought paper stock on concessions only, and even under those conditions, it is stated that it was difficult to make sales. No. 1 mixed papers declined to 37.25 from a range of .40 @ .42½ and corrugated boxes to .40 from a range of .55 @ .60.

News of the Trade

The American Writing Paper Company has inaugurated a national campaign for "distinctive advertising," designed primarily to increase sales of Eagle-A L'Aiglon. As preliminary work in the campaign each salesman is furnished with a booklet made of L'Aiglon paper, containing illustrations of the mailing pieces, which he studies. The booklet is intended to create enthusiastic cooperation of the salesman. "The 'Distinctive Advertising Campaign' must be put over in a manner highly satisfactory to everyone connected with it." To achieve this purpose, the full support of the organization is offered to assist in problems that confront the individual paper salesman.

Ten sales points are stressed. The paper has a richness reminiscent of Old World hand made papers, with feathery deckle edge and a felt-marked antique finish. The paper is made in natural white and five colors. Its versatility for a variety of printing uses is noted. Printing qualities of this paper are such that it takes inks without undue absorption. This impressive paper, whose great value results from selected ingredients and careful manufacture, although the price is moderate, is available for immediate delivery. Fourteen uses are listed for the lightweight L'Aiglon, such as booklets, etc., and eight for the heavyweight, such as catalogs, etc., although they may be used for many other purposes.

Carter Rice & Co., Corp., has a new window display, featuring the Oxford line of book papers, manufactured by the Oxford Paper Company, Rumford, Me. Through charts, special emphasis is given to the simplicity of the Oxford lineup of coated and uncoated book papers, comprised of only nine grades, but providing a paper for practically every printing requirement. These charts are supplemented by an attractive array of printed specimens, produced on the various Oxford papers.

The Rourke-Eno Paper Company, Hartford, Conn., has added to its stock the printing paper line made by the Brown Company, of Portland, Me., with plants at Berlin and Gorham, Me., and an office in Boston.

The Seth Winer Paper Company has taken over a complete line of cellophane bags and cellophane wrappings.

Robert A. Ford, who is associated with Henry L. Goodman, dealer in box coverings, has returned from a motor trip to Toronto, Niagara Falls and the Thousand Islands, accompanied by Mrs. Ford.

Fred Herbolzheimer, head of the fine paper department of the Andrews Paper Company, has returned to his duties after a five weeks' illness of pneumonia.

Benjamin C. Spaulding, secretary of Baird & Bartlett Company, box board dealers, has returned from a two weeks' vacation at Great East Lake, New Hampshire.

Storrs & Bement Company has added to its lines Gold Flake and Silver Flake, made by the Strathmore Paper Company, Mittineague, Mass.

Charles A. Esty, managing director of Carter, Rice & Co., Corp., was among those attending the convention of the National Paper Trade Association in Chicago last week.

Dauglas Swan, one of the owners of the New England Card and Paper Company, Springfield, Mass., called on the trade last week.

Indianapolis Demand Increases

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., October 9, 1933.—The coming of cooler weather has caused a slight increase in demand for most lines of paper. Jobbers of fine paper report a gradual expansion of business, most of it due to increased direct by mail advertising. Prospects also are good from the printers of catalogues for quite a few are figuring now on their work for catalogues to be put out around the first of the year.

Demand for wrapping paper and bags shows some expansion and jobbers are looking for more as the holiday season approaches. Just now the sale of Halloween novelties has begun and the initial orders are good, in fact initial orders are heavier considerably than last year, showing increased confidence of dealers in buying power.

With the coming of cooler weather, the demand for transparent papers has increased perceptibly. This comes in great measure from increased production of candy factories in the state, of which there are several large ones. Manufacturers of waxed papers for the baking trade show continued production.

Container men say business is expanding slowly. After the first initial rush, things quieted down during the summer, but now there is more optimism. Production, generally, is pretty close to capacity in many plants.

Paper stock men report a little more buying from the mills and the paying prices of stock in this section advanced slightly during the last week.

H. L. Derby, Jr's, New Post

H. L. Derby, Jr., has been appointed manager of the Chicago district of the American Cyanamid and Chemical Corporation, with headquarters at 20 North Wacker Drive, Chicago. The district embraces the territory West of the State of Ohio, extending to the Rocky Mountains.

Philadelphia Paper Market Marking Time

Unsettled Business Conditions, Pending Final Adoption of N R A Codes, Reflected in Paper Industry—Various Standard Grades of Fine Paper Moving Slowly—Coarse Wrapping Paper Sales Restricted to Moderate Demand for Immediate Needs

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., October 9—An uneventful week in the paper trade can be characterized as marking time rather than by any other designation. While there was nothing to cause enthusiasm there was on the other hand nothing at all to cause alarm or discouragement. Opinion generally seems to center on the Codes as the key to the present situation. It very directly affects the distributors themselves in the conduct of their own business, although pending the adoption of the particular Code for the industry, all are living up to the terms of the General Industrial Code. And again almost as directly, the fine paper trade at least is affected by the Code of their chief customers—the printers. This Code is awaiting final adoption; likewise in the coarse paper trade its sales are restricted to rather moderate volume of immediate demands because in the many industries which are coarse paper consumers, the problem confronting their activities is the dual one of N.I.R.A. Codes and of labor difficulties. While many of the strikes and walkouts which have been recurrent in almost every line of industry in this great industrial center have been adjusted, there are a number on the eve of adjustment, and there still remains quite a few where the strikes are continuous and with no immediate prospect of settling.

Of course, all these have been disturbing conditions and they certainly are reflected in the paper industry as a whole. One really disappointing factor in the situation is the withholding of what had been expected to be very aggressive direct sales campaigns by various industries and particularly the advertising agencies involving, of course, active paper sales. These campaigns, save in isolated instances, have not been launched, although there is no evidence of any abandonment of purpose to inaugurate them just as soon as industrial relationships and economic conditions make such a procedure advisable.

There will be held during the week two highly important meetings, one of the Paper House Credit Managers, and the other of the Fine Paper Division. It will be recalled that, as published in these columns two weeks ago, the fine paper houses agreed upon a distinctively Philadelphia plan of credits, which in effect was that where customers had not met their obligations, further credit would be withheld and they would be placed upon a strictly cash basis. Whether as the result of a direct evasion of the spirit of these resolutions or through a misunderstanding, is not known by certain houses concerned, but allegations are made that the spirit of this plan has thus far not been universally observed. Specific instances are reported by one thoroughly representative house where the loss of trade is threatened if there be insistence on the cash basis program; two of its customers have reported that if this particular house rigidly adheres to the program, as defined, it will be at the loss of business, the allegation being that in both cases offers have been made to advance personal loans by the head of certain distributors so that bills can be met and personal notes be accepted in return. It is doubted whether any such practise really exists, or if it does if it is more than sporadic. At all events it is probable that the subject will be brought up at both of the trade meetings to be held during the forthcoming week.

Meanwhile, a rather curious condition exists in the paper stock market. Some of the jobbers report an apparently concerted action to reduce stock unless concessions in prices are made. As a result at the beginning of this week certain reductions in quotations must be made, namely: in heavy and light books, in new manila and in print and container manila and in old kraft. These reductions average from 10 to 15 cents per hundred. On the better grades of mixed and chip, outside prices eased off slightly. From the point of view of the packers there is nothing in market conditions to warrant a reduction in this market, and advices they received from other large centers indicate that there is as this week begins a lower price schedule in Philadelphia than in these other centers. Meanwhile, however, the market conditions are virtually cleaned up each day, although it is true that no very large amounts of stock are coming in. The packers are not disposed at this time to be very eager in the collection of stock or in its sale, believing that the near future will see such an adjustment as will warrant a return to the price levels of last week. In other words, under conditions somewhat similar to those existing among the paper distributors, the packers are just marking time.

While NRA, of course, is conspicuous in trade talk, it became conspicuous in no way during the week. The Paper House of Pennsylvania, the Whiting-Patterson Company and other distributors of the Collins Manufacturing Company, Holyoke, are featuring its new line of watermarked N.R.A. bond papers.

The Paper and Bag Division of the Philadelphia Paper Trade Association will hold its regular meeting during the week at Broadwood Hotel, when applications for new members will be passed upon.

The Paper and Cordage Association will hold its stated meeting in the Ivory Room of the Adelphia Hotel on Friday, October 20. At this meeting, applications for membership will be passed upon, at which time they expect to take in eight; their aspiration being a goal of fifty.

Sabin Robbins Paper Company, formerly of 1028 North Delaware Avenue, is now occupying its new headquarters at the southwest corner of Fifteenth and Carpenter streets, with 20,000 additional square feet of floor space, and has installed additional facilities to increase production, which has made necessary the employment of additional workers in all departments.

Benjamin Thomas, general manager of Container Corporation of America, is back at his desk after a short vacation to White Sulphur Springs.

Ray Vance Addresses Paper Salesmen

Ray Vance, the well known economist and financier, was the guest speaker at the regular weekly luncheon and meeting of the Eastern Division of the Salesmen's Association of the Paper Industry, held at the Woodstock Hotel, New York, on Monday last.

In an interesting and informative manner, Mr. Vance discussed monetary conditions with reference to the possibilities and effects of inflation. Following his address, Mr. Vance answered many questions from those present. There was a good attendance and Mr. Vance's talk was greatly appreciated.

Canadian News Print Paper Production Expands

Materially Increased Output During Last Two Months Attributed to Speculative Buying by United States Publishers—Shipments by Dominion Mills Again Show Large Gains Compared With Last Year—Prominent Canadian Banker Discusses Code

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., October 9, 1933—Speculative buying by American publishers, who anticipate a possible increase in the price of news print, is believed to be mainly responsible for the pronounced increase in Canadian news print production in the past two months. If production figures in themselves are to be regarded as thoroughly reliable, there is every justification for the growing belief that the news print industry has turned the corner. The rate of increase in Canadian news print output in the past two months, however, has been so far out of line with normal trends or past history as to give rise to a doubt as to the genuineness of recent increases. It is pointed out that news print is unlike most commodities in that inventories can be measured as so many days supply. Production, shipments and stocks on hand, therefore, bear a close relationship when the trend of consumption is normal. The belief that the marked increase in Canadian production since midyear is due to a larger consumption is open to question.

Statistical records show that there is a close relationship between the trend of advertising lineage and the volume of consumption of news print paper in the United States. For instance February consumption appears to be out of line with the trend, the drop in consumption being greater than that which would appear to be warranted by the drop in advertising lineage. This is readily explained by the fact that the United States banking holiday occurred at this time, disrupting the normal course of the publishing business. The trend between consumption and advertising lineage in the first half of the year has a normal appearance. In July the Canadian mills report a sharp increase in production and shipments. This should be reflected in consumption in the United States and in advertising lineage.

Banker on News Print Situation

Recovery of business in Canada throughout the Autumn and Winter months will be conditioned mostly by progress of plans now on foot in the United States, in the opinion of a prominent Canadian banker, just back from New York, where he studied some effects of the new codes that are now being applied to American industry. He illustrated his point by reference to the Canadian news print situation. It is not yet known exactly how the news print code will work out in the United States, but when the results there are known, "Canadians will have nothing to do but to conform as gracefully as they can to the new conditions—if they wish to retain that market. And of course that is their market. We'll just have to make the best of it," he said. If Canadians continue to offer news print at below-cost prices, he added, there is some danger of tariffs or other import controls being applied by Washington to protect American manufacturers. A tariff rate, with a promise to remove the levy when the price of Canadian news print reaches a satisfactory level, is suggested. In the meantime it would be unwise for the governing bodies of Canadian news print units to proceed with financial and physical reorganizations until it is seen more clearly how the news print code will affect us, he said.

Toronto Paper Market Conditions

While September closed with a fair record of business for both the paper merchants and the mills, October has opened with a promise of light sales. Business began to fall off towards the end of last month and at the moment things are decidedly dull in both coarse and fine papers. The printing and other consuming industries are sending in very light requisitions and mills complain of the frequency of small runs to satisfy printing concerns who demand additional runs of paper in order to satisfy customers who have decided to increase their original order for direct mail pieces, booklets and other general printing lines. This sort of condition is keeping both tonnage and profits down, for it is the big straight runs that count.

While the coarse paper market is decidedly quiet, the paper bag situation has improved and sales are now fairly satisfactory, especially in regard to flour sacks. Mills making book, bond, ledger and writings are only moderately busy. The coated paper market is dull and sales very light. The envelope trade has picked up somewhat but the paper converting section of the paper trade is still complaining of lack of sales volume. Specialty lines are moving well. For instance, lines such as greaseproof, waxing and glassine are in excellent demand and mills manufacturing them are quite busy. The light weight paper market continues dull and is suffering materially from outside competition and the dumping of cheap American lines on the Canadian market.

Great Lakes Surplus Increased

Great Lakes Paper Company's operations continue to be directed by the National Trust Company, acting as receiver and manager, a position assumed in July, 1931. During the present year the company has been operated on a sounder basis in that settlement between receivers of the company and receivers of Minnesota and Ontario Paper Company was effected late in 1932, whereby Great Lakes Paper Company was assigned title to definite contracts for news print. The company was also able to secure other business and operations in 1933 have been around 65 per cent of capacity. A conveyor and storage warehouse were built at a cost of $60,000 to facilitate water shipments. The company owns a low cost news print mill of 100,000 tons annual capacity, located in Fort William, Ont., and has timber and pulpwood limits under lease sufficient to supply the needs of the mill operating at capacity for many years. Formerly the company marketed its product through Minnesota and Ontario Paper Company, but this corporate alliance no longer exists and Great Lakes Paper Company is in a position to secure and execute orders of its own. Earnings have been sufficient to cover operating costs, receiver's charges and build up some surplus, but as yet no payment has been made to holders of the $10,000,000 of 6 per cent first mortgage bonds of which interest has not been paid for over two years. Present prices for news print do not permit the company to earn interest charges.

New Agency for Toronto Firm

Valleyfield Coated Paper Manufacturers, Ltd., with mill at Valleyfield, Que., and Toronto office directed by R. A. Rawsthorn, University Avenue, are meeting with success in the manufacture and distribution of gold and aluminum coated box and label papers, of which they are sole manufacturers in Canada. Paper Sales, Ltd., King street West,

Toronto, have been appointed sole agents for distribution of these lines to the paper box trade in Ontario and are carrying stock in Toronto. Plans have been made to add at least an embossing design to the line within the next month. In Montreal T. B. Little Company, Ltd., and Paper Sales, Ltd., are the distributors for Quebec.

Safety Matters in Ontario Mills

D. B. Chant, secretary of the Ontario Pulp and Paper Makers' Safety Association, has returned to Toronto after a ten days' visit of inspection to the Northern Ontario paper mills. Mr. Chant inspected the mills at Port Arthur, Fort William, Fort Frances, Dryden, Kenora and Sault Ste. Marie and states that he found both mill managers and men taking a keen interest in safety matters in their respective plants.

Notes and Jottings of the Trade

George Carruthers, Toronto, president of Interlake Tissue Mills, has left for a business trip through the Canadian West to the Pacific Coast.

The proposed establishment of a pulp product plant by Canadian Keyes Fibre Company, Ltd., is still in the embryo state. The company has been formed as a subsidiary to the Minas Basin Pulp and Paper Mill, Ltd., of Hantsport, N. S. Preliminary work is under way but definite plans for the project have not been completed. The proposal will involve an extension to the present ground wood plant at Hantsport which would increase the production by 25 per cent. or more. In addition to this contemplated extension the company is starting this Fall on the development of a hydro power plant on the St. Croix River, which will ultimately produce about 4,000 h. p.

Provincial Paper, Ltd., head office Toronto, has issued a folder suggesting that printers and advertisers should give consideration to Paragon Offset in planning direct mail advertising.

The Interlake Tissue Mills, Toronto, had an interesting exhibit of their products at the Canadian Pacific Exhibition at Vancouver. The Columbia Paper Company, of Vancouver, and the Sidney Roofing and Paper Company also had samples of their products on display.

When most other prices are rising, the announcement of a reduction in price on several grades of Cellophane has just been made by Canadian Industries, Limited, who manufacturer Cellophane in Canada under contract with Du Pont Cellophane Company, Inc. This price reduction, which is the third since April, 1932, when the Canadian Cellophane plant went into production, evidences the carrying out of the stated policy of Canadian Industries, Ltd., to reduce prices progressively whenever expected volume of business and manufacturing economies make this possible.

St. Regis Paper Co. Ships Trees

[FROM OUR REGULAR CORRESPONDENT]

ST. REGIS FALLS, N. Y., October 7, 1933—The transportation of 6,300,000 young trees from the nurseries of the St. Regis Paper Company to camps in Michigan and Wisconsin for use in the reforestation program of the government has already been started. The initial shipment of the huge order left here last week and many species of Norway pine and spruce of two, three and four years growth were included in the order. The task of supplying the camps with the young trees is under the supervision of C. L. Van Schaick, superintendent of the forestry division of the St. Regis Paper Company. About 140 men are being employed for the next few weeks and about 10,000 feet of lumber is to be converted into crates for shipping.

PAPER MERCHANTS MEET IN CHICAGO

(Continued from page 13)

gress made and pointing out the job to be done in line with paper's "new deal."

The Wrapping Paper Division, under the leadership of H. L. Zellerbach, vice president, held a similar meeting in the afternoon. A report of the Survey Committee was given and commodity committee reports and discussions were given due prominence. A. H. Seyler reported on the activities of the Steering committee. An open forum on wrapping paper problems followed.

While the Code occupied much of the time of the general sessions, the matter of market development received much attention in informal discussions held throughout the entire four days. Sentiment among those in attendance was unquestionably improved and the industry gave strong indications of desiring to work out every step of the Code in a wholehearted way.

Paper Day Celebrated

Two side attractions helped to entertain the paper executives present at the Fall meeting. On October 5 a large number helped to carry out Paper Day, sponsored by the Paper Foundation in conjunction with a Century of Progress exhibit along the lake front. Special exhibits and souvenirs attracted huge crowds along with the paper merchants, who saw, at first hand, the marvelous job done by the Foundation in face of many difficulties. Commendation was on every tongue and the industry, as represented in Chicago, seemed to be proud of the job done and confident that the presentation would effectually stimulate the use of paper.

Also on Friday the Middle West Division of the Salesmen's Association of the Paper Industry made a strong bid for attention by acting as the host to a real golf outing held at the Olympia Fields Country Club. Tournament play in the afternoon brought out a huge crowd of visitors and the association did a fine job of putting on the entertainment feature. The dinner in the evening was the big event, featured as it was with the presentation of prizes and with the appearance of a number of notables in the paper industry who found their way out to the big club on Chicago's south side.

Warren Parchment Co. Formed

DEXTER, N. Y., October 7, 1933—Incorporation articles were filed this week showing that the Warren Parchment Company is the name under which the new owners of the paper mill here will operate. Stockholders include P. Kaiser, G. Monahan and E. L. Vallee, all of New York city. Operations have already been started at the plant and about 25 tons of kraft paper for use in the manufacture of bags is being turned out. Several weeks ago the plant was purchased from John J. Warren and extensive repairs have been under way since that time. E. D. Leslie has been supervising activities and it is expected that about 75 hands will be employed. The Ron-Noc-O Paper Company was the last occupant of the plant and carried on operations for more than a year.

To Represent National Waterproofing Co.

The National Waterproofing Company, manufacturers of waterproof papers, plain and reinforced; wax papers, tympan, stencil boards, Front and Line Streets, Camden, N. J., announces that its New York office is now in charge of Heywood H. Allan, who is their sole representative in that territory. There has been no change in the address: 41 Park Row, New York, N. Y. Telephone Cortlandt 7-2020.

The Trimbey-Witham, Jr., Consistency Regulator and Freeness Recorder*

The old adage that the "sheet of paper" is made in the beater room rather than in the machine room is as true today as ever it was. Of course machine conditions and manipulation must be right to produce the best results, but ever so much care and skill and attention at the paper machine will not entirely offset or remedy faulty preparation of the stock before it reaches the machine chest.

In mills making the better grade of paper, the old-time beaterman knew stock, and his long years of experience enabled him fairly satisfactorily to maintain and reproduce the necessary treatment to give the stock the desired character or qualities.

Importance of "Freeness" Control

The importance of controlling that characteristic of stock known as "freeness" is becoming more and more appreciated by the practical paper maker in the beater room and the machine room as well as by the technical man in the laboratory. Frequent and regular freeness determinations are now made in all mills and the hour by hour results are posted for the benefit and guidance of the beater man. This information is valuable, but it frequently comes to him too late to be of the greatest value and some improperly treated stock reaches the paper machine before the trouble is discovered.

Under the urge of stern necessity this has brought about the development of a method and apparatus for continuously determining freeness and both indicating and recording this important characteristic of the stock as it leaves the Jordan. At the same time the consistency or density of the stock is automatically controlled before entering the Jordan and a record given of the variations in the consistency leaving the beater chest. The apparatus used for his purpose is the "Trimbey-Witham, Jr.," Consistency Regulator and Freeness Recorder.

Practical Application

In its practical application, the Jordan discharge enters the vat of this machine; one portion passes through the well-known Trimbey Consistency Regulator and controls the admission of the necessary thinning water at the Jordan inlet to reduce all of the stock to the desired consistency; a second portion passes beneath the slowly revolving freeness wheel, which is a narrow bronze cylinder having six equally spaced perforated plates on its circumference. Each of these perforated areas connects with the usual bucket type arrangement for elevating the water which drains through the perforations to the hollow central shaft.

This freeness wheel is rotated at a constant speed from the motor and reducing gear of the consistency regulator. It is carried in bearings over a channel or spout in which the moving stock is kept at a constant depth by means of an overflow dam at the end and through being supplied with a fixed volume of stock from an orifice.

Since by "freeness" is meant the "rate of drainage," it can readily be seen that the volume of water removed by this cylinder when rotating at a constant speed and immersed to a constant depth in stock of a fixed and uniform consistency, is a measure of "freeness" and anything which changes the freeness will cause a corresponding and immediate change in the rate of drainage as shown and recorded by this apparatus.

The water thus removed is led to a standpipe having a constant "bleeder orifice" of suitable area to back up a head of several inches in the standpipe. The resultant head is recorded by means of any of the usual low level liquid recording pressure gauges, and is also shown by the attached gauge glass on the side of the standpipe. The maximum range of head is from ten to fifteen inches.

Greatest Help in Maintaining Uniformity

This apparatus will not "make paper," but in regular operation it has shown itself to be of the greatest help in maintaining that uniformity of product which is so necessary under today's marketing conditions.

Aside from his experience and ability to judge stock by the "feel," the beaterman has no other assistance except possibly a wattmeter on the Jordan motor. To furnish stock of an even freeness it is not enough to regulate the Jordan setting so as to draw constant power; consideration must be given to the original character of the pulp and the preliminary treatment it received in the beaters before coming to the Jordan if uniformity is to be achieved after it leaves the Jordan.

Different Treatment Required

In mills where different sources of supply are used each pulp has its own qualities and requires a little different treatment. Even with the pulp from one source of supply there are differences between succeeding cooks, or bleachers, and where two or more beaters are used for servicing a given paper machine the conditions of bed plates, rolls, etc., are seldom exactly the same with the result that there are changes in the degree of hydration of the supply to the Jordan as each succeeding beater is dumped. Broke must be worked back into the system. It should be done as uniformly as possible, but each time the rate of addition of broke is changed it alters the freeness of the resultant mixture. It is in automatically detecting these differences and immediately bringing them to the operator's attention that the chief value of this apparatus is found and in doing so it can bring to the assistance of the beaterman the most useful tool he could have. The permanent record is invaluable to the foreman.

* Presented at the Fall Meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents Association, Jefferson, N. H., September 30, 1933.

Contour Measuring Projector

The Bausch & Lomb Optical Company, of Rochester, N. Y., has just issued an attractive and interesting illustrated booklet describing its Contour Measuring Projector. This is an optical instrument for the precise measurement and inspection of small parts in manufacturing.

The Contour Measuring Projector throws a highly magnified image of the profile of the part under investigation by optical projection on a chart or screen. An error of only a thousandth of an inch appears a quarter of an inch in size under a magnification of 250 diameters, and an error of one ten-thousandth is readily discernible.

In this booklet are shown some of the tasks ordinarily considered difficult, which the Contour Measuring Projector is doing easily and quickly. Copies of this valuable pamphlet may be obtained upon application.

Obituary

John M. Monahan

THREE RIVERS, Mich., October 9, 1933.—John M. Monahan, well known here during the past ten years as an influential citizen, died at his home on Portage avenue recently. He had been seriously ill less than a week.

Mr. Monahan has been a resident of Three Rivers since 1923 when he came to this city as comptroller for the Eddy Paper Corporation mills here. Since that time he has been general manager of the local plant and largely dictated its policies under the Keickhefer control.

While a member of the community, Mr. Monahan has taken prominent parts in civic affairs, having served as president of the Three Rivers Hospital Board for the past several years. He held that position at the time of his death.

John M. Monahan was born January 6, 1889, the son of John and Joana (Corcoran) Monahan, at Branford, Conn. In 1921 he went to International Falls, Minn., as comptroller of the M. and O. Company.

He was united in marriage to Evora V. Feely, of Fort Francis, Ontario. Following his marriage, Mr. Monahan went east and shortly afterward was made manager of the Pride Pulp and Paper Company of Tomahawk, Wis., where he remained for eight months, until he was offered position as comptroller of the local Eddy Paper Corporation, a position he kept until he was promoted to the managership of the company interests here.

He is survived by his widow, Mrs. Evora Monahan; two small sons, Jack and Jerry; his mother, Mrs. Joanna Monahan, of New Haven, Conn.; a brother Frank Monahan, of New Haven; three sisters. Mrs. Harry De Wolf and Mrs. Frank Kane, of New Haven; and Sister Ignatus Loyola of St. Peter's Convent, Hartford, Conn.

Lewis H. Kunhardt

BOSTON, Mass., October 9, 1933.—Lewis H. Kunhardt, president of the Paper Mill Mutual Insurance Company, died October 2 at his residence, Melrose Highlands, Mass., aged 64. Mr. Kunhardt was born in Brooklyn, N. Y. He was graduated from the Massachusetts Institute of Technology in 1889. After a year as instructor in that institution he joined the engineering department of the Associated Factory Mutual Fire Insurance companies. In 1906 he was named vice-president of the Boston Manufacturers' Fire Insurance Company and was elected president in 1929. He was a director of the Fall River Manufacturers Mutual.

For several years he had devoted considerable study to traffic problems in Boston and had worked out detailed plans for additional highways to be developed in connection with the principal railroad lines. His principal recreation was sailing off Cape Cod, where he had a summer residence.

There are living his wife, who was formerly Sarah E. MacDonald of Boston, and four children, Mrs. J. Henry Colon, of Hartford, Conn.; Mrs. Victor Czegka, Melrose Highlands, Mass.; Mrs. D. F. Beekman, Schenectady, N. Y., and John Newton Kunhardt, of Melrose Highlands.

Mrs. Frank P. Waterhouse

BOSTON, Mass., October 9, 1933.—Mrs. Alice Dunbar Waterhouse, wife of Frank P. Waterhouse, formerly in the wholesale paper business, but retired from active life some years ago, died October 2 at her residence, 98 Lincoln Avenue, Wollaston, Mass., in which section of Quincy the family had resided for more than fifty years.

Mrs. Waterhouse was born in Boston, the daughter of Jonathan and Rebecca (Dunbar) Poole. She was in her seventy-fifth year. She was a member of the Unitarian Church. For some years, she had passed her winters in Altamonte Springs, Fla.

Besides her husband, there are living a son, Edward T. Waterhouse; a granddaughter, Mrs. Richard Gordon Faux, and a sister, Mrs. Adelaide C. Armstrong, all of Wollaston.

Frederick D. Coope

BOSTON, Mass., October 9, 1933.—Frederick D. Coope, for some twenty years associated with Whitney Brothers, inc., dealers in wrapping paper and twine, and clerk of the corporation for approximately the last seven years, died suddenly last Tuesday. Mr. Coope, who had been at the office of the company that day, had suffered from heart trouble the last two years. He had gone to his garage at his residence, 123 Highland Avenue, Somerville, Mass., to put up his car. He went upstairs to a window and fell out. He was taken to a hospital, but died at 5 o'clock.

Mr. Coope, a veteran of the World War, was born in Charlestown, Mass., the son of Charles and Margaret (Watters) Coope. He studied at the Somerville Latin School, soon afterwards entering the employ of Whitney Brothers. At the outbreak of the war, he enlisted in the Navy, making several trips across the Atlantic and remaining in the service throughout the war.

He was a member of the American Legion and of the Episcopal Church. His wife, who was Alice Grant, of Brookline, Mass., is living.

Sturgis Salmon Cushman

MONTREAL, Que., October 9, 1933.—The death occurred at Ottawa recently of Sturgis Salmon Cushman, former vice-president of the E. B. Eddy Company, and one of the Ottawa Valley's outstanding industrialists.

Born at L'Original, Ont., on January 7, 1849, he moved to Hull, Que., in early life and at 18 years of age began his association with the Eddy firm, his first job being planing boards for boxes in which matches were packed.

Then he went into the bookkeeper's office, later becoming cashier, and advancing through various stages to a position on the board and finally to that of vice-president, a position he held until his retirement four years ago.

In 1875 he was married to Miss Achsah Bullard, of Swanton, Vermont. She died about eleven years ago, and Mr. Cushman's only daughter, Mrs. Elsie Boughton, met a tragic death a year ago in an automobile accident. Mr. Cushman was a descendant of Robert Cushman, a leader among the English Puritans who came to this continent in the *Mayflower*. Robert Cushman later returned to England and organized a further expedition in the vessel *Speedwell* to colonize the new land.

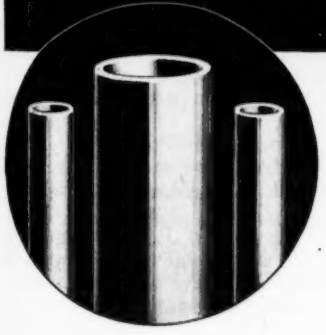
John H. Noonan

GLENS FALLS, N. Y., October 7, 1933—John H. Noonan, president of the local branch of the International Brotherhood of Paper Makers, died suddenly at his home here this week. Besides holding the presidency of the local union he was also a candidate for treasurer of the main body a few years ago. At the time of his death he held a responsible position with Finch, Pruyn and Co. For several years he was also prominently identified with politics in that city. The survivors include three sons, two brothers and two sisters.

Have you modernized yet?

Profit by these outstanding advantages of National USS 18-8 Stainless Pipe and Tubes for

Pulp and Paper Manufacture



1. Highly resistant to corrosion by sulphite and sulphate pulping liquors, bleaches, and similar paper-making chemicals.
2. Freedom from rust and discoloration.
3. Immune to "carbide precipitation" and intergranular corrosion following welding operations (stabilized U S S 18-8).
4. Seamless—no welds; no uncertainty about full wall-strength in every tube.
5. Exceptional ductility, and twice the strength of ordinary steel.
6. Easily machined, bent, welded, or otherwise fabricated.
7. Wide range of diameters, wall-thicknesses, lengths, and shapes.
8. Produced with unrivaled facilities, by the largest manufacturer of tubular products in the world.

Stainless steels are rapidly achieving a place of the utmost importance in the pulp and paper industry. Begin now to modernize your plant by adopting this superior material for digester relief lines, heater coils, pulp stock lines, bleaching tank piping, and similar services where corrosion of equipment or discoloration of product leads to excessive operating or maintenance costs. NATIONAL engineers and metallurgists will gladly aid in determining the most effective application of the U S S 18-8 alloys to specific service requirements.

U S S Chromium-Nickel Alloy Steels are produced under the licenses of the Chemical Foundation, Inc., New York, and Fried. Krupp A. G. of Germany.

NATIONAL TUBE COMPANY · PITTSBURGH, PA.

Visit the exhibits of the Subsidiary Manufacturing Companies of United States Steel Corporation, in the GENERAL EXHIBITS BUILDING—A CENTURY OF PROGRESS EXPOSITION, *Chicago.*

NATIONAL USS STAINLESS AND HEAT RESISTING PIPE AND TUBES

"Facts About Paper Values"

Every once in awhile there appears a sales or advertising booklet which may properly be described as of outstanding interest and value.

"Facts about Paper Values," a brochure which has just been issued by the L. L. Brown Paper Company, Adams, Mass., merits this description on several counts. In addition, it has the unique distinction of performing the seemingly paradoxical feat of illustrating the invisible yet vitally important factors of quality in paper.

The first part of this remarkable booklet is a concise and vivid description of the natural and unchangeable differences between rag papers and those which are made largely or exclusively from sulphite. As stated in the foreword, this intensely interesting material is presented pictorially. The text matter is strictly confined to the essential explanatory facts, which are given in simple, easily understandable terms. This treatment characterizes the entire work.

With the reader thoroughly informed about the fundamental differences between rag and sulphite papers, the booklet illustrates the distinctive qualities of the two chief kinds of rag-content papers,—those made from white linen and cotton clippings and those made from colored rags. Pictures and text explain why the paper maker must treat these two classes of rags differently. The effects which these contrasting treatments have on permanence and resistance to discoloration are revealed by means of striking microscopic photographs.

Everyone who buys or sells paper knows that paper has certain intangible properties which are just as important as the obvious qualities, such as appearance, "feel," finish, bursting resistance, folding strength, et cetera. He knows also that these elusive and unseen factors are frequently among the hardest to demonstrate and sell.

To remedy the latter condition, "Facts about Paper Values" shows the most potent of these unseen factors, and explains the part each plays in determining quality, durability and permanence. One of the invisible, yet vital, properties which are graphically presented is the formulas which are used. Another is the very important matter of processing. A third relates to balance, that quality which assures each essential property in the precise degree needed to give maximum service and value on the part of all properties combined.

The booklet is 8½ x 11 in size and consists of 44 pages. It is not only very instructive but is a splendid example of typography and printing. Especially interesting is the interior stock. To permit of using half-tones, which are employed profusely, and at the same time to secure greater resistance to hard handling, the booklet is printed on Brown's Linen Ledger permanent record paper, coated on two sides. This is the first instance of the 84-year-old paper being shown in this form.

"Facts about Paper Values" is not being distributed generally. Applications for it should be made to the company's distributors.

J. F. Fitzgerald Goes With Collins Mfg. Co.

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., October 10, 1933.—James F. Fitzgerald of Maple Street, for several years past boss machine tender at the Riverside Division of the American Writing Paper Company, Inc., has resigned to accept the position of assistant superintendent of the Collins Manufacturing Company at North Wilbraham. At a recent gathering he was guest of honor and presented with a traveling bag by his associates.

Manufacturers of Pulp and Paper Machinery and Equipment Organize

The National Association of Manufacturers of Pulp and Paper Machinery and Equipment was organized at a meeting held on Thursday, September 28, at the Commodore Hotel, New York City.

The following officers were elected to serve until the annual meeting next February:

President—Phillips Dennett, President of the Baird Machine Company, South Walpole, Mass.

Vice President—Charles L. Bauer, President of the Bauer Brothers Company, Springfield, Ohio.

Treasurer—W. B. Wilshusen, Secretary of the Cameron Machine Company, Brooklyn, N. Y.

The board of directors in addition to the three officers are:—J. E. Waterhouse, general manager, Montague Machine Company, Turners Falls, Mass. A. B. Clark, president, J. O. Ross Engineering Corporation, New York City. L. L. Foss, purchasing agent, Union Machine Company, Fitchburg, Mass. S. G. Bevis, president of Bevis Machine Company, Middletown, Ohio. Samuel M. Langston, president of S. M. Langston Company, Camden, N. J.

The Constitution and By-Laws for the organization and a Code of Fair Competition were discussed and tentatively approved at the meeting for final ratification by the members. The Code will be presented for the approval of the Recovery Administration at Washington as rapidly as possible.

Superintendents Meet at Holyoke

HOLYOKE, October 10, 1933.—The annual meeting of the Connecticut Valley Division of the American Pulp and Paper Mill Superintendents' Association was held Saturday night at the Hotel Clinton, Springfield, when the following officers were elected: Chairman, John P. Kennedy of the American Writing Paper Company, Inc., of Holyoke; first vice chairman, Stephen Stapley of the Chemical Paper Manufacturing Company, Holyoke; second vice chairman, T. M. Pomeroy, of the Crane Mills in Dalton; third vice chairman, Gordon Booth of the Robert Gair Corporation, Montville; secretary-treasurer, John Brown of the Chemical Paper Manufacturing Company of Holyoke.

The principal speaker was Robert L. Emminger, National secretary-treasurer of Miamisburg, Ohio, who has visited the various divisions and gave a report on their condition and activities, especially on the newly formed division on the Pacific coast. A. C. Drew told of the NRA and its workings and outlined its future application to the industry. Claude H. Smith of Holyoke was chairman of the committee of arrangements.

Bids on Government Paper

[FROM OUR REGULAR CORRESPONDENT]

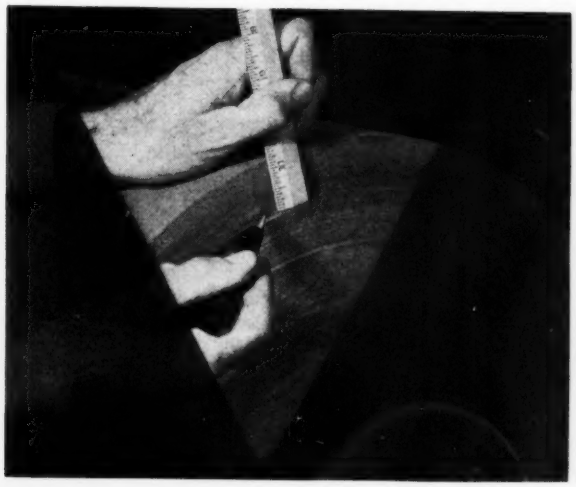
WASHINGTON, D. C., October 11, 1933—The Government Printing Office has received the following bids for 2,000 pounds of No. 1 gummed kraft paper; Barton, Duer & Koch Paper Company, at 10.5 cents per pound; Walker-Goulard-Plehn, Inc., 9.5 cents; Mathers-Lamm Paper Company, 9.34 cents, 9.15 cents; 10.69 cents, 11.3 cents; and 9.2 cents; R. P. Andrews Paper Company, 9.45 cents; Old Dominion Paper Company, 9.89 cents; Lindemeyr Paper Company, 9.4 cents; Reese & Reese, Inc., 7.59 cents; Cauthorne Paper Company, 9.1 cents; and W. L. Jones, Inc., 10.5 cents.

IT DOESN'T COST A CENT

. . . to know the Difference!

It doesn't cost a cent to know the difference between old fashioned rolls with the hard rubber base, and modern Goodrich Vulcalock rolls with soft cushion rubber clear to the core. But it costs real money *not to act* on that knowledge in order to get 40% more cushion wear.

Before Vulcalock—*A hard-rubber-base roll about to be recovered. Note that the soft rubber cushion is worn down to about ¼". The rest is "dead" hard rubber.*



After Vulcalock—*The Vulcalock Roll made exclusively by Goodrich eliminates the hard rubber base, gives you soft rubber cushion from outer surface to metal core.*

THE hard rubber base *used to be* essential, as a binder between cushion surface and metal core. At best the adhesion of hard rubber base to metal core was none too good (not more than 35 pounds per square inch) and the manufacturer frequently had to tamper with the cover compound so that cover and base could be vulcanized at the same time. The layer of soft cushion rubber was limited in thickness and useful life in exact proportion to the thickness of the hard rubber base layer which had no cushioning properties. This meant so much cushion waste. It meant loss of metal through re-roughthreading, added cost of rubber needed to build up the roll to correct outside diameter—every time recovering became necessary; *and shorter life to the roll.*

Then Vulcalock was discovered—an exclusive Goodrich process for bonding rubber directly to metal with an adhesion which exceeds 500 pounds per square inch. By this process Goodrich builds a roll that gives you 100% live cushion rubber clear to the core—40% more cushion wear, longer service between grindings; and by eliminating re-roughthreading preserves the life of the roll. With all these advantages, first cost is practically the same!

When you stop to compare these two types of paper mill rolls, the difference is obvious and startling. Why not do something about it the next time you buy, and specify Goodrich Vulcalock Rolls?—The B. F. Goodrich Rubber Company, Mechanical Rubber Goods Division, Akron, Ohio.

ROLL COVERINGS—BELTING—HOSE—MISCELLANEOUS RUBBER PRODUCTS

Goodrich

ALL *products problems* IN RUBBER

NRA MEMBER U.S. WE DO OUR PART

Vulcalock *Paper Mill Rolls*

New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry have announced the following elections to membership:

Robert H. Aborn, assistant metallurgist, U. S. Steel Corporation, research laboratory, Kearny, N .J., is a 1918 graduate of Grinnell College and attended Massachusetts Institute of Technology. He was formerly an instructor at Harvard University.

J. Rex Adams, plant chemist, Old Colony Envelope Company, Westfield, Mass., is a 1928 graduate of Rose Polytechnic Institute and received his master's degree in 1929 from Carnegie Institute of Technology. From 1929 to 1931 he was an industrial fellow at the Mellon Institute in Pittsburgh.

C. L. Bachelder, sales engineer, Paper Makers Chemical Corporation, Kalamazoo, Mich., has been advanced from Associate to Active membership in the Technical Association.

Maxwell H. Boyce is a 1933 graduate of the University of Wisconsin and has worked during summers for the Wausau Paper Mills, St. Regis Paper Company, and the Sherman Paper Company.

Leslie C. Currier, engineer, The Sorg Paper Company. Middletown, Ohio, is a 1926 graduate of the Massachusetts Institute of Technology and was formerly assistant superintendent of the Berwin Paper Company, Dansville, N. Y.

John McCrystle, superintendent, Brown Corporation, La Tuque, P. Q., is a 1922 graduate of the University of Maine.

Malcolm P. Pineo, paper machine operator, Scott Paper Company, Chester, Pa., is a 1933 graduate of the University of Maine and was formerly employed by the Eastern Manufacturing Company, South Brewer, Maine.

Henry W. Piquet, mechanical engineer, MacAndrews & Forbes Company, Camden, N. J., is a 1918 graduate of Stevens Institute of Technology and was formerly engineer for the Fuel Engineering Company, New York.

Daniel Stacy, superintendent, American Box Board Company, Grand Rapids, Mich., attended Berea College and was formerly superintendent of Hinde & Dauch Company, Sandusky, Ohio, and the Gypsum, Ohio, mill of the U. S. Gypsum Company.

Paul L. Taplin, paper tester, Gilman Paper Company, Gilman, Vt., is a 1932 graduate of the University of Maine.

Japan's Paper Production Higher

Paper production in Japan during the month of July as reported to the Japanese Paper Manufacturers Association, reached a total of 60,158 short tons as against 55,635 tons in the preceding month and 54,644 tons during the corresponding month last year. Sales during July, which had dropped to 48,398 tons in June, rose to 63,233 tons, an increase of 13,864 tons over the corresponding month of last year. Production for the seven months period of the current year totaled 399,672 tons as against 379,686 tons during the first seven months of last year.

Ronald Benson Goes To Carthage

CARTHAGE, N. Y., October 7, 1933—Ronald Benson, of Seattle, Wash., has arrived here and taken up his new duties as head of the technical department at the National Paper Products Company. For the past few years he has been identified with the Crown-Zellerbach mills on the Pacific Coast, but more recently has been a chemical engineer with various industries in the East. He plans to move his family here in the near future.

Form "Blue Ridge" Chapter of Paper Mill Supplies Institute

At a largely attended interesting meeting of dealers, graders and packers of paper mill supplies, held Monday, September 25, at the New Howard Hotel, Baltimore, Md., the Blue Ridge Chapter of the American Paper Mill Supplies Institute was formed and the following officers were elected: Thomas W. Lydon, of Baltimore, president; I. Rudick, of Amity Iron and Metal Company, Inc., vice president; Leon Epstein, of Hanover Iron and Metal Company, treasurer; Julius Hoffman, financial secretary and Sidney Wolk, recording secretary.

The meeting was called to order with Thomas W. Lydon acting as temporary chairman. Following the election of officers, Mr. Lydon in accepting the presidency of the Chapter pointed out the advantages of membership in the American Paper Mill Supplies Institute, as compared with other organizations. Following Mr. Lydon, I. Rudick, of Amity Iron and Metal Company, Inc., touched on some of the subjects of vital importance to the industry. L. Q. Owens, of the Atlantic Waste Paper Company, and others also addressed the assemblage. The meeting was attended by every dealer, grader or packer of prominence in Baltimore and Washington.

The Blue Ridge Chapter will take in the States of Delaware, Maryland, Virginia and West Virginia and the District of Columbia.

Applications for membership in the newly formed Chapter were received from the following Baltimore concerns: Acme Iron and Metal Company, Amity Iron and Metal Company, Inc., Samuel Angelo, M. Aronson & Sons, Atlantic Waste Paper Company, F. P. Bohager and Sons, William Fowler, A. Gudis, Sam Gudis and Company, Hanover Iron and Metal Company, E. J. Herr, Harry Hoffman, L. Landay Sons, Thomas W. Lydon, Sam Margolis, Max Pikoos, Radford Waste Company, Alex Rubin, Sirkis Brothers, Inc., Standard Rag and Paper Company, and Ward Paper Company. Application for membership was also received from the Cook Waste Paper Company, of Washington, D. C.

Boston Paper Market Dull

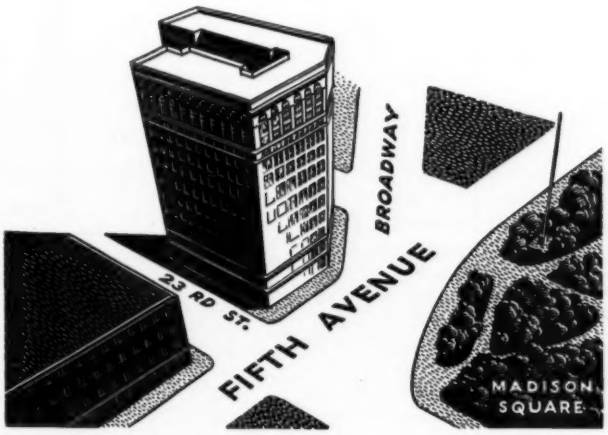
[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 9, 1933.—While Chicago was host to the paper world during the week, markets in general drifted along without much of a stimulus from buyers. The element of marking time which characterized markets prior to rapid "new deal" developments seems to again be in vogue as buyers hesitate to see which way conditions are progressing. Little change was noticed in the prices themselves. Fine paper groups are interested in the adoption of the sliding scale and all groups, of course, are mindful of the provisions of the Code of Fair Practices which are going to force a stiffening of prices if many firms are to stay in business.

The kraft market showed little change during the week, markets holding fairly firm but demand quieted down. The same situation prevailed in the fine paper field. Bonds and ledgers were quoted as drifting along, while books and covers experienced a slowing down in demand, although markets were reported as firm enough. News print conditions were only slightly more favorable, while ground woods were sluggish as far as demand was concerned. Paper board conditions were slightly bettered with the proximity of a busier season, as were tissues and wrappings.

The old paper market was virtually unchanged, according to reports.

A STRATEGIC LOCATION



Situated right in the heart of an international market, The Fifth Avenue Building offers to manufacturers an address that carries dignity and prestige. It is a strategic location—the center of business Manhattan.

Here, in this famous building, leaders in many and varied lines have their sales and executive offices. Here come buyers and merchants from the two Americas and from the other side of the world.

The Paper Trade is well represented. Among the tenants of this famous building are manufacturers of Paper and Pulp, Paper Mill Supplies and Machinery, Paper Box Board and Paper Products—as well as many makers of finished paper products such as stationery, greeting cards, playing cards, paper novelties and toys, etc.

If you are contemplating the acquisition of a New York address that will command the same respect in all quarters of the globe, by all means locate in the Fifth Avenue Building. It is but ten minutes from the Pennsylvania Station and but thirteen from Grand Central. Light and air unaffected by skyscrapers. Buses and surface cars pass the doors. Convenient to hotels. Subway entrances in building. Smart new restaurant on the ground floor. Information booth in lobby. Efficient elevator service. Why not let us show you through the building?

THE FIFTH AVENUE BUILDING

BROADWAY AND FIFTH AVENUE AT MADISON SQUARE, NEW YORK

"More than an office building"

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Orange, Tex.—The Commercial Pulp and Paper Company is said to be planning reconstruction of certain present buildings and installation of new equipment. Company proposes to arrange financing for about $300,000, considerable part of fund to be used for purpose noted.

Dedham, Mass.—The Boston Envelope Company, Center street, Jamaica Plain, Boston, has revised plans in progress for new paper converting plant at High, Colburn and Maverick streets, Dedham, to be two-story and basement, 50 x 138 feet, reported to cost close to $25,000, with equipment. H. R. Duffie, 364 Belgrade avenue, West Roxbury, Mass., is architect.

Milwaukee, Wis.—The Consolidated Waste Paper Company, 223 West Oregon street, is considering early rebuilding of portion of storage and distributing plant, recently destroyed by fire with loss over $50,000.

Chicago, Ill.—The Arvey Corporation, 3440 North Kimball avenue, manufacturer of card stocks and other paper products, boxes, etc., has begun superstructure for new addition to plant, recently referred to in these columns, to be one-story, 55 x 135 feet, reported to cost close to $25,000, with equipment. Rudbeck & Gross, 5334 Hutchinson street, city, are architects.

Whippany, N. J.—Frank Desiderio & Sons, Inc., 262 Jefferson street, Newark, N. J., has begun operations at former local mill of the Hanover Paper Mills, at one time owned and operated by the United Paperboard Company, and will use for the manufacture of cardboard and container board stocks. The plant has been closed for about three years, and was recently acquired by the Desiderio company at a public sale. Employment will be given to about 125 men for initial operations and this quota will be increased at early date. Improvements have recently been made in equipment. The company purchased a similar mill at Clifton, N. J., some time ago, and this plant will be run in conjunction with the Whippany mill.

Niagara Falls, N. Y.—Fire recently damaged a portion of local plant of the Electric City Paper Company, 25 Adams avenue. An official estimate of loss has not been announced, but is reported as slight. The damage will be replaced.

Shawinigan Falls, Que.—The Consolidated Paper Corporation, Ltd., has completed an improvement program at its local mill, and will place unit in operation at early date, with three machines in service. The plant has been closed down for about four months.

Montreal, Que.—Bowater's Paper Mills, Ltd., London, England, manufacturer of news print, is securing a controlling interest in Price Brothers & Company, Ltd., Quebec, Que., with large mills at Kenogami, Que., for pulp and news print production, and will be active in the reorganization of the Price Brothers interests. The Bowater organization, operated by the Imperial Mills, Ltd., London, will secure about 100,000 tons of news print per annum from the Price mills. The Price company has been in financial difficulty for a number of months.

New Mercury-Switch Thermometer Controlled

The use of mercury switches to eliminate open make-and-break contacts controlled by the pen arm, is a revolutionary feature of a new Automatic Control Thermometer announced by The Brown Instrument Company of Philadelphia, Pa. In this new Controller, every six seconds a motor-driven control table determines the location of the pen on the chart in reference to the control setting, and tilts the mercury switch from one side to the other if the temperature has changed.

With this unique system, the measuring mechanism is free to position itself, unhampered by the control mechanism. There is no excess weight on the pen, no distortion of the pen arm, no restriction of pen movement. The making of control contacts is not dependent upon friction, because the switch is positioned with a positive action by the electric motor. Contacts are unaffected by vibration because the mercury switch is mechanically locked in place until a different position is required. Corrosion and dirty contacts are eliminated as the switch is sealed in glass. These mercury switches have capacities up to 15 amperes at 110 volts (10 amperes at 220 volts), thus eliminating external relays in most applications.

This control mechanism is adaptable to one-, two-, or three-contact control (or signalling) systems. In the two-record controller, each control mechanism can control a separate device, each may be used independently of the other, and each has its own control index.

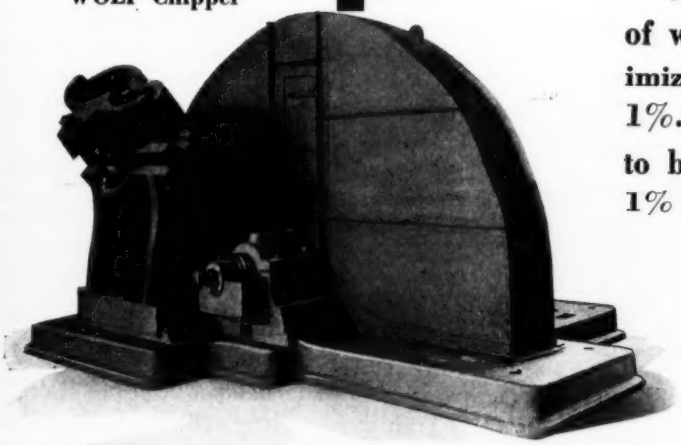
This new Brown Controller is also supplied as a time-temperature cycle controller. A transparent cam placed over the chart is used to shift the control index in relation to time. As the cam rotates with the chart, the control point is moved to new positions.

All models of this controller are furnished in circular 10-inch or 14-inch dust-proof cases, and offer all the outstanding features of the new Brown Recording Thermometer and Pressure Gauge, introduced two months ago For example, the measuring mechanisms are rugged and powerful; electric chart drive is standard at no extra cost; cases are back or bottom connected and interchangeable for flush, front-of-board or wall mounting.

This new Brown Controller is equally adaptable for control of pressure, liquid level, and similar factors, as well as temperature. Catalog 6702, completely describing this new line of controllers, has just been issued and a copy of this book will be sent promptly upon request. Readers should address their request to The Brown Instrument Company, Philadelphia, Pa.

Profits In Production Economy

The 106" WOLF Chipper



ACCORDING to actual records, the Wolf Chipper will net a saving of about $4000 a year.

Chips are of uniform size. Cost of wear and repairs is greatly minimized. Sawdust is reduced to .68 of 1%. One mill advises that "sawdust to boiler house is kept well below 1% with the Wolf Chipper."

Less than

1% SAWDUST

by actual mill tests

Other "VALLEY" Equipment

BEATERS
JORDANS
ROLL WRAPPING MACHINE
LABORATORY EQUIPMENT
PUMPS
VOITH INLET
DECKERS
SCREW PRESSES
PLUG VALVES
FLAT AND ROTARY SCREENS

Now is the time to install a Wolf Chipper. With increasing labor and material costs, *profits must be realized through production economies.* The Wolf Chipper is a proven cost-saving machine. By direct comparison between three different makes of chippers on actual runs the Wolf Chipper proved itself by far the best chipper in every department of performance.

We'll gladly send you the detailed facts. Write for full particulars.

VALLEY IRON WORKS COMPANY

Plant: Appleton, Wisconsin

New York Office: 350 Madison Ave.
Canadian Representatives: Pulp & Paper Mill Accessories, Ltd., Montreal, Canada

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PACIFIC TAPPI TO MEET IN TACOMA

With Tacoma chosen as the convention city for the 1933 fall meeting of the Pacific Section of the Technical Association of Pulp and Paper Industry, on October 20 and 21, national attention is directed to the rapidly growing pulp and paper industry of the Pacific Northwest on both sides of the Canadian line. During the thirteen year interval since 1920 rapid growth of the industry in Washington caused the production to rise to a total of 45 per cent of the whole Pacific Coast output, the expansion of operating plants to 26 and the entry of large eastern companies into the field as well as organization of strong local ones. Prior to the World War the Northwest paper industry was largely confined to the operations of the Crown Willamette Company in the Columbia River district, the Hawley Pulp and Paper Company at Oregon City and the Everett Pulp and Paper Company at Everett, Wash., pioneer Northwest book paper manufacturers, headed by William Howarth and A. H. B. Jordan, with substantial interest owned by the late Leonard Howarth of Tacoma, lumber capitalist and one of the leaders in the St. Paul and Tacoma Lumber Company.

After the World War a rapid growth in plant expansion took place in the State of Washington, with unique and almost boundless opportunities for perpetual supply of pulpwood, cheap electricity and pure water, together with unusual shipping facilities to Atlantic Coast ports offered by steamship through the Panama Canal. It may be properly said that the Panama Canal and the decline in the huge lumber volume beginning in 1907 caused the paper industry to establish itself in the Pacific Northwest—lumber and timber interests began turning to pulp and paper as an outlet for their waste and a new source of revenue.

In the Tacoma district the infant pulp and paper industry of the Puget Sound area, represented by the Everett Pulp and Paper Company and the Fibreboard Products Company at Sumner, got off to a good start when the late Henry Hewitt and John De Bleyker collaborated on the idea of establishing a paper mill in Tacoma shortly before the World War began. Mr. Hewitt was one of the Northwest's outstanding capitalists, coming from Menasha, Wis., shortly after he and his brother founded a paper mill there. His plans were to set up a mill on Chambers Creek, southwest of the city, but the War and his death in 1918 ended the dream. Immediately after the end of the war, his plan was taken up by Frank S. Baker, prominent Tacoma publisher, his father, Elbert H. Baker, of Cleveland, Ohio, the sons of Henry Hewitt and other prominent Tacomans. The Cascade Paper Company was organized and a plant built on Chambers Creek, and a crew of expert paper-makers headed by James Coleman, were brought out from Kalamazoo, Mich. The mill began operations with a 122-inch Fourdrinier and operated successfully as a book mill, buying locally produced soda pulp. Later a 154-inch Fourdrinier and a 30-ton soda pulp mill were added and in a subsequent reorganization the mill was acquired by the Everett Pulp and Paper Company.

During the ten years following 1923 rapid growth in Northwest paper industries followed, with various affiliated companies of the Crown Willamette-Crown Zellerbach-Fleishhacker interests of San Francisco establishing mills at Port Angeles, Port Townsend, Shelton, Grays Harbor and elsewhere. E. M. Mills organized and established the bleached sulphite mills at Shelton, Grays Harbor and Port Angeles. The St. Helens Pulp and Paper Company was organized, built and managed by Max Oberdorfer as a kraft and wrapping mill; a mill established at Vancouver, Wash., and the Oregon Pulp and Paper unit at Grays Harbor were outstanding in this new picture. Fibreboard Products established another mill at Port Angeles, and also the big plant of Olympic Forest Products Company making sulphite fiber was built there, with the Washington Pulp and Paper Corp., as a newsprint mill rounding out the trio of large spruce using mills in the key city on the Olympic Peninsula. Under the vigorous leadership of F. W. Leadbetter, the Tumwater Paper Mills Company at Olympia, the Columbia River Paper Mills at Vancouver, Wash., and the Oregon Pulp and Paper Company of Salem were organized. On Puget Sound another active pioneer, Ossian Anderson, of Everett, organized the Puget Sound Pulp and Timber Company, with mills at Anacortes, Bellingham, and Everett, is now busy expanding these operations. The highly successful tissue mills, the Pacific Coast Paper Mills at Bellingham, headed by J. J. Herb, also came into being during the last ten years.

Down on the Columbia River at Longview, where a vast marsh full of ducks, mud and swamp grass held forth as late as 1921, the paper industry sprang into being after Longview was founded as a lumber city by R. A. Long, of Kansas City, in 1922. First came the Longview Fibre Company, headed by M. A. Wetheimer and H. L. Wool-

lenberg, followed by the Pacific Straw Paper and Board Company, headed by Charles F. Schaub, and lastly the great sulphite pulp mill of the Weyerhaeuser Timber Company of Tacoma, first step into the pulp field by this timber company whose holdings are a huge empire by themselves. Headquarters for the vast Weyerhaeuser operations in the West, with 8,000 payroll in three states, are in the Tacoma Building, Tacoma. The company operates three saw mills in Everett, logging camp at Vale, Wash., one of the largest saw mills in the world at Longview, a match in size to the Long Bell mill, and a big pine mill at Klamath Falls, Ore. Affiliated companies form an impressive roster in themselves, the White River Lumber Company at Enumclaw, Willapa Harbor Lumber mills at Raymond and the Snoqualmie Falls Lumber Company at North Bend. Advent of the Weyerhaeuser interests into the pulp field is one more illustration of the importance of the Northwest Pacific Coast. With two large mills in British Columbia and three or four mills elsewhere in the area, the Northwest now has paper making as an industry, established in every key center in the Northwest. Spokane has a fine mill also.

Climatic conditions favor the paper industry of the North Pacific more than practically any other region in the world, as the vast cutover acreage, if protected from fire, will grow pulpwood as a crop in twenty years. Ample and literally endless supply of lime-rock from Alaska and the San Juan Island and Northwestern Washington; cheap electric power that is sold in Tacoma as low as 1½ mills per KWH for the lower brackets, pure soft water and cheap transportation on a perennially competitive basis to all the world, and cargo-thirsty west-bound intercoastal steamers bring sulphur from the Gulf states at ridiculously low rates at all times. Labor conditions in the Puget Sound-Columbia River area favor the paper industry, and point to a far more rapid expansion in the next 15 years than all the years to date.

In the center of this rapid growth of the paper industry that before the war was relatively small and insignificant with the two British Columbia mills and the Crown Willamette and Hawley operations as the only exceptions, Tacoma has become a leading factor. After the Cascade Paper Company was founded, about the year 1926, strong agitation came to start more mills. The Shaffer Box Company, large export box makers, started a sulphite mill on the Hylebos Waterway in Tacoma, and under the vigorous leadership of Ralph Shaffer, forged ahead as a new venture into the pulp field for Atlantic Coast trade. The Union Bag and Paper Company was established in conjunction with the Hemlock mill of the St. Paul and Tacoma Lumber Company, on the St. Paul-Puyallup waterways in Tacoma, as a branch of the Union Bag operations in New York. Later this became a division of the St. Regis Paper Company, known as the St. Regis Kraft Company, with a 325,000 lb. daily output of sulphate fiber. The busy, but small roofing paper plant of J. E. Berkheimer Manufacturing Company was expanded and its products sold over the Pacific Coast.

Outstanding proof of Tacoma's key position in the paper business was the establishment here in 1929 of large branch plants of two of America's greatest chemical industries, manufacturing chlorine and caustic soda, the Hooker Electrochemical Company of New York, and the Pennsylvania Salt Company establishing its plant as the Tacoma Electrochemical Company. The attractive Hooker plant is outstanding in the entire chemical industry, occupying a 21-acre site on Hylebos Waterway adjoining the old Todd Shipyards site, with 1200 feet of deep water frontage on the Government dredged channel. The Tacoma Electrochemical Company began operations during the same year, with a smaller plant located on the same waterway on a 40-acre site. The Hooker operations in Tacoma are headed by Wm. A. Pervin, John A. Flynn and Albert H. Hooker, Jr., while the Tacoma Electrochemical Company is headed by J. H. Baker and F. C. Shaneman.

Tacoma sells water at the low rate of $20 per million gallons to pulp mills and electricity from its four municipal power plants to all industries from 5 mills down to 1½ mills per KWH. The location in an area of even rainfall assures rapid reforestation and dependable water supply. Barge transportation can tap Alaska's great Southeastern forest belt, and four railroads assure dependable land transportation. Radiating like spokes from a giant wheel is the Northwest Pulp industry. An illustration of how the idea works out is in the big operations at Shelton of the Rainier Pulp and Paper Company, founded by E. M. Mills and the late Mark Reed, Washington capitalist and lumberman. This big sulphite mill at Shelton makes a grade of Rayon fiber that commands high prices on the Atlantic Seaboard. This pulp is made from hemlock and is the first rayon mill to be established in the Northwest.

A half dozen pulp projects are in sight already for the next era of growth, including two giant ones in Alaska, and several within the State of Washington.

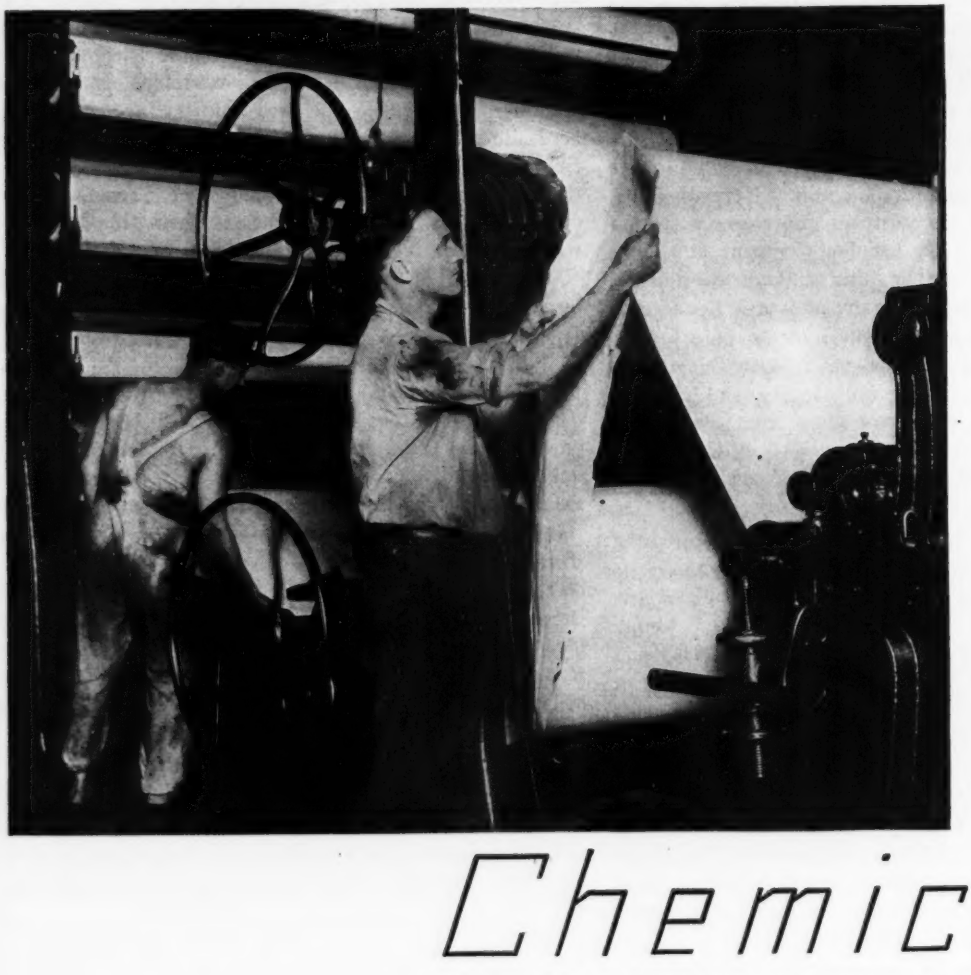
Tacoma has two outstanding paper wholesale houses, with enviable standings. The Tacoma and Stationery Company, headed by Frank E. Jeffries, founded in 1910, and the Standard Paper Company founded originally as the H. N. Richmond Paper Company in 1889, now headed by Roy E. Davisson as President and Treasurer, and Frank A. Wilhelmi as Vice President.

A. H. Hooker, Jr., is general chairman of the meeting and is assisted by Dennis Cousins, Ralph Shaffer and Fred Shaneman. Allen Abrams, of the Marathon Paper Mills, and president of the Technical Association will be the speaker at the annual banquet and will spend some time in the West making plans for the great National TAPPI Convention at Portland, Ore., on August 28-31, 1934.

St. George Pulp Co. Starts Mill

The St. George Pulp and Paper Company has been taken over by new interests, and began operations at St. George, New Brunswick, last week. This mill will make approximately fifty tons of groundwood pulp per day. H. C. Howes will continue as manager of the mill. The pulp will be sold by Edward B. Murray, 405 Lexington avenue, New York, N. Y.

Coating



Chemicals

CASEIN – CHINA CLAY – SATIN WHITE

If making fine coated papers is your business, no one needs to tell you your coating equipment and chemicals must be GOOD. But maybe you don't know that coating chemicals by American Cyanamid & Chemical Corporation have more than a hundred years' "service record". This name is comparatively new; but in its coating chemicals division a long-established company is represented . . . a company formerly independent, known the world over for the quality of its products and its familiarity with paper makers' needs.

AMERICAN CYANAMID & CHEMICAL CORPORATION

535 Fifth Avenue, New York

Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Drying

Method and Press for Removing Water From Paper. Antoine François Valentin. Fr. pat. 733,105 (Feb. 10, 1932).—The essential feature of the invention consists in that the sheet is subjected to pressure at more than one point while in contact with the same cylinder. In the preferred construction each press consists of a small stack of three rolls, instead of the usual pair of press rolls. If desired the sheet may be held between two wires or two felts or a wire and a felt as it passes through each press.—A. P.-C.

Paper Drier. Aktiebolaget Karlstads Mekaniska Werkstad. Fr. pat. 730,976.—The feature of the invention is a distributor by means of which the steam can be introduced into the drying cylinder in such a way as to obtain uniform heating. The distributor consists of a fixed steam inlet pipe extending about half way into the length of the cylinder and suitably perforated near its inner end. A sleeve, having perforations corresponding to those of the inlet pipe, is mounted over the perforated portion of the pipe in such a way that it can be rotated by means external to the drying cylinder.—A. P.-C.

Drying Pulp. G. E. Coblens and A. W. Morris. Brit. pat. 351,170 (May 6, 1930).—The material is dried between two perforated plates or wire grids embedded in the material and heated by electric currents which do not pass through the material and the process may be regulated so as to effect electric osmosis.—A. P.-C.

Drier Felt Seams. H. N. Hill. Paper Trade J. 95, No. 20:41-41 (Nov. 17, 1932).—A brief description of the various methods of joining the ends of drier felts, including the Asten-Hill Mfg. Co.'s patented clipper seam.—A. P.-C.

The Drying of Paper and Felts. Reinhard Schulze. Pulp Paper Can. 33:433-6, 485-487 (Nov., Dec., 1932).—Results are reported of experimental runs for removal of vapor within the paper machine and for additional drying of injected hot air.—A. P.-C.

Machine for Surfacing the Tops of Paper-Machine Suction Boxes. Jakob Langenbacher. U. S. pat. 1,882,187 (Oct. 11, 1932).—The device consists of a frame in which the surfacing tool, with its driving motor, can be caused to travel both in the longitudinal direction of each separate suction box and in the transverse direction over all the suction boxes. The device may be used as a separate machine in which the suction boxes are placed on removal from the paper machine or may be mounted directly on the paper-machine frame in such a way as to be readily removed when necessary.—A. P.-C.

Process and Arrangement for the Drying of Webs of Stock. Rudolf Steinmetz, Steyrermuhl. Aust. pat. 128,803 (Feb. 15, 1932). The vapors from the sheet, as it passes through the drying section, are removed by ducts, the water removed and the dry air is returned to the dryers.—J.F.O.

Moisture Regulator. Josef Muchka, Vienna. Aust. pat. 128,669 (Feb. 15, 1932). The individual drying cylinder or group of drying cylinders are provided with separate regulators.—J.F.O.

Seam for Dryer Felt on a Paper Machine. Aktiengesellschaft Fezfabriken, Vienna. Aust. pat. 128,673 (Feb. 15, 1932).—J.F.O.

Process for De-Watering of Ground Wood, Straw Pulp and Chemical Pulps. Maschinenfabrik Buckau R. Wolf Akt. Ges. Magdeburg. Aust. pat. 128,662 (Feb. 15, 1932).—J.F.O.

Steam Trap for Drying Cylinders. Wilhelm Funk, Bruck. Aust. pat. 127,192 (Nov. 15, 1931). The principle of the new steam trap concerns the steam leaving the drying cylinder. The condensate carried along with this steam is separated in the steam trap and the steam is returned to the cylinder. In this manner a greater part of the heat in the steam is utilized, which formally was unused.—J.F.O.

Seam for Dryer Felts, Especially for the Manufacture of Paper. Aktiengesellschaft Fezfabriken, Vienna. Aust. pat. 128,115 (Jan. 15, 1931). The seam makes an endless web on the felt which gives it an unbroken surface.—J.F.O.

Joining the Ends of Dryer Felts for the Manufacture of Paper. Eduard von Asten, Eupen, Belgium. Ger. pat. 552,516 (Oct. 6, 1929). The purpose of the invention is to join the ends of a felt in such a manner that a completely unbroken working surface is formed, and to be able to do this in a short time.—J.F.O.

Process for the Utilization of the Heat in the Dried Material Which Has Been Dried in Long Drawn Out

Drying Canals. J. Olsson & F. Stenfors, Stockholm. Swed. pat. 73,650 (June 16, 1928). The passage of the material to be dried is so arranged that the heat therefrom aids in heating the incoming material.—J.F.O.

Drying Apparatus for Flat Materials, Especially Board. Benno Schilde Maschinenbau Akt. Ges. Hersfeld. Ger. pat. 557,770 (May 1, 1931). The material to be dried is carried on the frame of a screen.—J.F.O.

The Suction Box Covering. Wochbl. Papierfabr. 63, No. 49; 895-96 (Dec. 3, 1932). A practical discussion on suction boxes, the covering in particular for which the author recommends the use of leather as the best covering material.—J.F.O.

Arrangement for Interior Heating of Rotating Rolls and Cylinders. Caliqua Warmegas m.b.H. Berlin. Nor. pat. 50,878 (April 18, 1931). —J.F.O.

Device for Drying Apparatus for Webs of Stock. B. S. Nyquist, Dynas. Swed. pat. 74,577 (Dec. 27, 1928). The heat from waste gases from the smelt or soda ovens is used in chambers for the drying of the stock.—J. F. O.

Process and Arrangement for Pressing Out the Water from Ground Wood, Pulp, and Similar Materials. Nicolai Alfsen, Oslo. Nor. pat. 50,676 (June 18, 1927). The unit pressure gradually increases.—J.F.O.

Process for Drying of Board and Other Flat Materials. Beno Schilde Maschinenbau Akt. Ges. Hersfeld. Aust. pat. 129,602 (April 15, 1932). A system of ventilators in canal dryers.—J. F. O.

Arrangement for a Heat Interchange Apparatus for the Heating of Liquids Passing Through. E. Morterud, Torderoed, Norway. Swed. pat. 74,928 (Oct. 21, 1930). —J. F. O.

Process for Obtaining and Maintaining a Layer of Polyhedron Shaped Gas Bubbles Over the Surface of a Liquid. Industrikemiska A. Bol. Stockholm. Swed. pat. 74,857 (April 22, 1929).—J. F. O.

Process and Arrangement for Obtaining intimate Contact Between Gases and Liquids During Heat Interchange, Thickening and Absorption. Industrikemiska A. Bol., Stockholm. Swed. pat. 74,856 (July 2, 1929). —J. F. O.

Screens

Screen. Société E. et M. Lamort Fils. Fr. pat. 733,436 (June 8, 1931),—The screen plates, instead of forming the periphery of a cylindrical drum, are arranged in pairs about the circumference of a relatively small diameter drum, so that one longitudinal edge of each of the pair are in contact at some distance from the drum, while the other longitudinal edge of each plate is fixed to the periphery of the drum the edges of the two plates being some distance apart. The screening surface is thus in the form of a multiple-pointed star.—A.P.C.

Centrifugal Pulp Screen. Establissements Gauss. Fr. pat. 733,616.—The invention provides for the use of an instantaneously removable centrifuge bowl of the same type as covered by Fr. pat. 563,405, of March 8, 1923. It is driven by friction segments which are mounted on the vertical shaft of the machine and which are pressed against the inside of the bowl by centrifugal force.—A. P. C.

Centrifugal Pulp Screen. Anton J. Haug. U. S. pat. 1,882,662 (Oct. 18, 1932).—The principal object of the invention is to provide a machine of relatively large capacity combining the two functions of screen and dirt separtor. The general construction of the machine is somewhat similar to that of the erkensator, but the rotating bowl has a vertical perforated wall which throws the stock against a frustro-conical shaped casing with the larger diameter at the bottom. The fine heavy impurities (sand, etc.) collect at the circumference of the base, whence they are removed through a specially designed pocket valve; and the good stock overflows the top of the casing and a skimming blade is provided at the outlet to remove the light floating impurities.—A. P. C.

Cylinder for Knotters for Screening of Paper Stock. Carl Nebrich, Prague. Ger. pat. 561,779 (Sept. 7, 1930). —J. F. O.

Centrifugal Screen for Ground Wood, Pulp and Similar Materials. Firma J. M. Voith, Heidenheim. Ger. pat. 558,447 (Dec. 4, 1928),—J. F. O.

Arrangement for a Centrifugal Screen for Pulp, Ground Wood, and Similar Materials. A. Bol. Sundsvalls Forenade Verkstader, Sundsvall, Swed. pat. 73,640 (Aug. 8, 1928). Arrangements are made to prevent the increase in stock consistency due to the water which leaves due to centrifugal force.—J. F. O.

Horizontal Screen with a Fast Rotating Screen Drum Which is Completely Submerged in the Stock, and in Such a Manner That the Stock Moves Axially Within the Drum. Linke Hofmann Busch Werke Akt. Ges. Bad Warmbrun. Ger. pat. 553,671 (Nov. 11, 1930).—J. F. O.

Cylindrical Screen, Especially for Paper, Board and Pulp Manufacture. Ernst Buchhaas, Prague, Czechoslovakia. Ger. pat. 557,413 (Feb. 14, 1932).—The compartment for the passage of the water is arranged between the perforated cylindrical mantel and the screen—J. F. O.

Arrangement for Screening. Wessel Waal, Oslo. Nor. pat. 50,826 (Aug. 15, 1931).—J. F. O.

Arrangement for the Cutting Up, Removal of Dust, and Screening of Old Paper, Rags and Similar Waste Materials. Gustav Schurz, Duren. Ger. pat. 563,112 (Dec. 12, 1927).—J. F. O.

Special Shaped Horizontal Rotating Cylinder Screen for Wood Chips. J. O. Marland, Karlstad, Sweden. Nor. pat. 50,390 (Nov. 3, 1930).—J. F. O.

Paper Specialties

Paper. Cie. Française de l'Iode et de l'Algine. Fr. pats. 729,028 and 729,030 (March 10, 1931). —*No. 729,028*—The mechanical properties of papers are improved by adding to the pulp in addition to the usual materials a syrupy solution of an alkali or aluminum alginate. *No. 729,030* describes the addition for the same purpose of a mud of demineralized algae obtained by treating crude algae with a binary solvent such as alcohol-water or acetone-water and treating with an alkaline liquor.—A. P.-C.

Rendering Paper Moisture, Grease and Acid Proof. Logan A. Dils, assignor to Kellogg-Dils, Inc. U. S. pat. 1,871,842 (Aug. 16, 1932).—Paper is treated with a solution which may be prepared by heating water in which has been dissolved gelatinous material such as glue, gelatin and Irish moss, a purifying agent such as dimethyl ketone, glycerol, potassium and sodium aluminum sulphates and a small proportion of formaldehyde, and then, after drying, the paper is further treated with a fixing bath formed of "methyl spirits," formaldehyde and glycerin.—A. P.-C.

Rosin Size

Process for the Manufacture of Solid Rosin Size, Especially for the Manufacture of Paper. Wilhelm Schafer, Wiener-Neustadt Aust. pat. 126,434 (April 15, 1931).—Rosin which can be saponified, is saponified with alkali under the vestige as little water as possible and in the presence of a protective colloid; to such an extent that a sample becomes solid after cooling and is strongly insoluble in water, that is, a rosin size capable of being emulsified.—J. F. O.

Effect of Relative Humidity on the Moisture Content and Bursting Strength of Four Container Boards*

By C. O. Seborg[1], R. H. Doughty[2] and P. K. Baird[3]

Abstract

The effect of relative humidity in the range from 0 to 97 per cent on the moisture content and Mullen bursting strength of four commercial container boards is shown. In common with numerous other cellulosic materials, the boards exhibit a hysteresis in moisture content. The moisture content at a given relative humidity depends on whether equilibrium was reached by adsorption or desorption of moisture.

The Mullen strength varied with the moisture content, reaching a maximum at about 6 per cent, corresponding to a relative humidity of about 40 per cent on adsorption or 30 per cent on desorption, and falling off very rapidly above 12 per cent moisture content. Temperature variation from 80 deg. F. to 72 deg. F. had a very minor effect on moisture content and strength at 65 per cent relative humidity. The hysteresis effects on strength and on moisture were similar.

Bringing sheets to a relative humidity of over 90 per cent resulted in a marked permanent increase in strength, possibly brought about by the release of stresses set up during manufacture.

The percentage variation with moisture content from the maximum strength was nearly the same for the four boards tested.

The moisture content of a sheet of paper or board affects its weight and its strength as well as other properties. This is a fact of importance to all sellers and buyers of papers or paper products. The moisture content of a given paper or board depends on (*a*) the humidity of the atmosphere in which it is placed; (*b*) the temperature of that atmosphere; (*c*) whether the paper has been brought to that atmosphere from one of higher or lower humidity; and (*d*) the nature or type of the paper. The strength also is known to vary with these same factors.

The general nature of these effects of humidity is well known and has been the subject of numerous investigations (*3*) (*4*) (*5*) (*6*) (*7*) (*8*) (*9*) (*10*) (*13*).[4]

The effects on strength properties are represented by the curves of Fig. 1, which is reproduced from the work of Houston, Carson, and Kirkwood (*6*). These are composite curves for a large number of samples of paper, and show the general form of variations to be expected.

The present report describes a quantitative study of certain of these effects for a special material, namely the variation with relative humidity of the moisture content and bursting strength of four container boards selected from commercial stock.

Received August 28, 1933

* Presented at the fall meeting of the Technical Association of the Pulp and Paper Industry, Appleton, Wis., September 26-28, 1933.

[1] Assoc. member TAPPI, junior chemist, Forest Products Laboratory, Forest Service, U. S. Dept. of Agriculture, Madison, Wis.

[2] Member TAPPI, asst. engineer, Forest Products Laboratory.

[3] Member TAPPI, senior chemist, Forest Products Laboratory.

[4] Italic numbers refer to "Literature Cited" at the end of this report.

Experimental

Material

The four boards examined included one engine-sized fourdrinier kraft board, and three news-filled jute cylinder boards. These were all 16-point sheets from regular commercial production. The jute boards, containing about 30 per cent new kraft pulp and 35 per cent each of corrugated cuttings and mixed papers, weighed approximately 200 pounds per ream (24 x 36 — 500) or 67 pounds per 1,000 square feet; the all-kraft board weighed 40 pounds per 1,000 square feet. Twenty-four 12-inch by 12-inch sheets of each board were used as samples. These were marked O, P, C, and F, the latter being the all-kraft board.

Humidity Control

The samples were conditioned in rooms controlled within ±2 per cent of 30, 65, 75, 90, and 97 per cent relative humidity respectively at 80 degrees ±1 deg. F., and within ±2 per cent of 65 per cent relative humidity at 72 degrees ± 1 deg. F. The samples were dried in an electric oven at 215 to 220 deg. F. to obtain a zero relative humidity value. One additional humidity condition was obtained by regulation of the radiation and ventilation in an office, which, since the work was done in cold weather, could be maintained over considerable periods at 14 to 16 per cent relative humidity and 80 to 85 deg. F.

Procedure

Four series of tests were run on the various boards. The first or pilot series had as its purpose the determination of the proper starting point in the moisture content-relative humidity relation for the later tests. The boards were presumed to have left the process of manufacture at 6 per cent moisture content and it was desired to study the various property relations that the boards would exhibit when taken from this to higher or lower moisture contents. The second series was run to determine the interrelationship of the use conditions of relative humidity, moisture content, and bursting strength. The tests were run at constant temperature. The third series was a study of the effect of temperature on the moisture content-bursting strength relation at constant relative humidity.

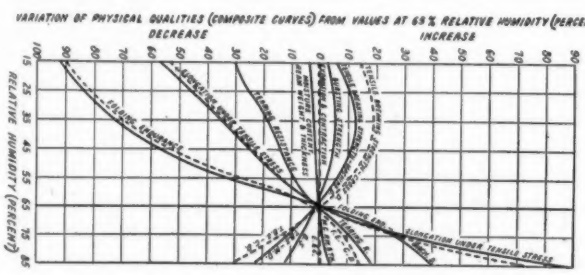

VARIATION OF PHYSICAL QUALITIES (COMPOSITE CURVES) FROM VALUES AT 65% RELATIVE HUMIDITY (PERCENT)
DECREASE
INCREASE
RELATIVE HUMIDITY (PERCENT)
TENSILE STRENGTH
ELONGATION UNDER TENSILE STRESS

Fig. 1.
Variation of physical properties with relative humidity.
(Houston, Carson and Kirkwood.)

The fourth series was designed to show the hysteresis effect in strength and moisture content with different relative humidities at constant temperature.

In the first or pilot series small samples in weighing bottles were seasoned in each of the humidity rooms, and then dried to constant weight at 220 deg. F. The relative humidity (30 per cent) yielding a moisture content nearest 6 per cent was selected from these results.

In the second series eighteen sheets (12 by 12 inches) of each of the four samples were seasoned in the 30 per cent room, individually weighed and six bursting tests made on each sheet, three on each side. The start was thus made at approximately 6 per cent moisture content as shown by the pilot series.

The eighteen sheets were then divided into six sets of three, one of which was placed directly in each of the six 80 deg. F. humidity conditions already listed. After seasoning, the sheets were weighed and tested. Finally all the sheets were oven-dried, weighed and tested in the dry state. This procedure gave simple relations between strength, moisture content, and humidity; it also gave a check on the pilot series of moisture determinations.

To determine the effect of temperature, three sheets from each of the sample groups O, P, and F were conditioned and tested successively in the following humidity rooms:

Relative humidity per cent	Temperature deg. F.
65	72
65	80
97	80
65	80
65	72

Variations in the moisture content and strength values determined for these sheets at equilibrium in the 65 per cent rooms, were obviously due to differences in the temperature. The 97 per cent, 80 deg. F. condition was interposed to get a sufficiently high moisture content to obtain desorption at 65 per cent relative humidity and 80 deg. F.

The hysteresis of strength and of moisture content was determined by seasoning, weighing, and testing five sheets of sample C in each of the 80 deg. F. humidities in succession, starting at 15 per cent, progressing up to 97 per cent, down to oven-dry, and up again to 97 per cent relative humidity. One bursting strength test was made on each side of each of the sheets at each equilibrium point reached under these successive conditionings. A check on the moisture content values was also obtained by carrying the small samples used in the pilot tests through the humidity cycle just given.

The bursting strength tests were made with a calibrated motor-driven Mullen tester. The values are given in "points" and are not factored to ream weight, because readings in points are of direct interest to board manufacturers and users and are not affected by increase of weight with increased moisture content. To use the factored values would have the effect of raising the strength values at low relative humidities and greatly depressing them at high relative humidities.

The weighings for the pilot tests and for the moisture hysteresis determinations of the fourth series of tests, were made on an analytical balance. Other weighings were made on a triple beam balance sensitive to 0.03 grams. The sheets ranged in weight from 18 to 36 grams. Moisture content is reported as percentage of the weight of the oven-dry sheet.

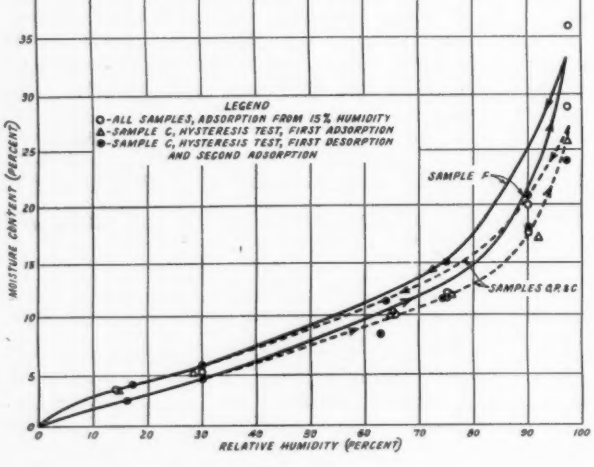


FIG. 2.

The Moisture content-relative humidity relation for four container boards. Curves drawn to average all data.

Discussion of Results

The experimental data are presented in the accompanying tables and figures as average values for all the sheets tested. An indication of the accuracy to be expected in the values is given by Table I. This is a random selection from the numerous sets of data and shows the results of tests on one group of sheets at 30 per cent relative humidity.

Moisture content data from the first, second, and fourth series of tests are included in the discussion of the relation between moisture content and relative humidity. The variation of strength with relative humidity and with moisture content at constant temperature as shown by the second series, the effect of small temperature variation as shown by the third series, and the hysteresis effect on strength as shown by the fourth series of tests are discussed in order.

TABLE I
TABULATION OF DATA TAKEN AT RANDOM TO SHOW VARIATION OF SINGLE TESTS

Sample	Sheet No.	Sheet weight Grams	Bursting Strength (Mullen) Liner side * Points			Filler side Points			Average	Moisture content Per cent
O	1	29.26	91	80	90	83	70	75	81	5.2
	2	29.15	87	91	93	85	82	80	86	5.2
	3	29.41	93	100	102	67	90	80	89	5.1
P	1	29.85	82	79	73	79	80	74	78	5.4
	2	29.74	78	79	78	78	80	83	79	5.5
	3	29.35	86	68	72	77	81	66	75	5.4
C	1	30.57	90	87	94	96	88	80	89	5.4
	2	29.57	82	91	94	88	88	90	89	5.0
	3	29.47	89	94	75	79	95	91	87	5.1
F	1	19.02	101	90	101	88	99	85	94	5.4
	2	19.22	82	96	92	98	92	99	93	5.6
	3	19.00	98	90	79	99	83	87	89	5.6

* The "F" or fourdrinier kraft sample was not filled.

Moisture Content and Relative Humidity

Contrary to an impression frequently held, there is not an absolute relation between relative humidity and the moisture content of paper boards. The fact that a given sample is seasoned or brought to equilibrium in an atmosphere of definite relative humidity and definite temperature is no assurance that it will always contain the same amount of moisture (*7*). The moisture content is affected materially by the "approach," that is, whether the sample is brought up from a lower moisture content or down from a higher; and furthermore, by the point from which drying (desorption) or wetting (adsorption) starts. This erratic behavior, termed hysteresis, is common to the moisture content-humidity relationships of all cellulosic materials (*2*).

The hysteresis effect for the four boards used in this work is shown in Table II and in Fig. 2. The curves show

that a sample taken from a dry to an intermediate atmosphere contains less moisture than one brought from a wet atmosphere to the same intermediate one. The difference between the adsorption (lower) and desorption (upper) curves varies from zero at the extremes to 3 per cent at approximately 75 per cent humidity. Between rero and 80 per cent humidity, the adsorption moisture content is almost exactly 80 per cent of the desorption moisture content. This is true for both the kraft and the other sheets, although it may be noted that the kraft sheet (sample F) has a consistently higher moisture content at the higher humidities than samples O, P, and C. Viewed in another way, over the range from 0 to 80 per cent relative humidity the difference in moisture content between adsorption and desorption corresponds to a 10 per cent difference in relative humidity. This is in agreement with recent findings of the Bureau of Standards for print papers.

TABLE II
MOISTURE CONTENT OF CONTAINER BOARDS AT VARIOUS RELATIVE HUMIDITIES

Sample	Approach	Relative humidity (per cent)					
		Moisture content (per cent)					
O	Adsorption	3.5	4.8	9.7	10.8	18.1	25.9
	Desorption	..	5.6	11.8	13.4	19.7	....
P	Adsorption	3.7	4.9	9.8	11.3	18.6	26.5
	Desorption	..	5.8	12.1	13.7	20.3	....
C	Adsorption	3.8	4.7	9.7	11.1	18.3	26.3
	Desorption	..	5.8	11.8	13.5	20.2	....
F	Adsorption	3.6	4.8	9.8	11.4	19.8	30.0
	Desorption	..	5.7	12.5	14.3	22.2	....

The foregoing is true only if the sample is taken quite to the end of the cycle, and started from oven-dry or 97 per cent conditions. If the initial point is taken elsewhere different results are obtained. For example, if the cycle was made between 20 and 65 per cent humidity as the limits, a closed loop would be obtained lying within the larger loop of Fig. 2. The open circles of Fig. 2 represent the behavior of the samples in the second series of tests. These samples stood in an office at about 20 per cent relative humidity, and since they were dried down to only 6 per cent moisture content on the machine they lost moisture during storage. Then on conditioning at 30 per cent the moisture content reached a value between the two branches of the large hysteresis curve. At 65 per cent relative humidity the moisture content was still slightly above the lower curve; at higher humidities the points coincided with it, and at 15 per cent they coincided with the upper curve. These points, from 20 to 65 per cent relative humidity, represent the lower, or adsorption branch of a limited sorption cycle. The deviation of the points at 97 per cent relative humidity may be ascribed

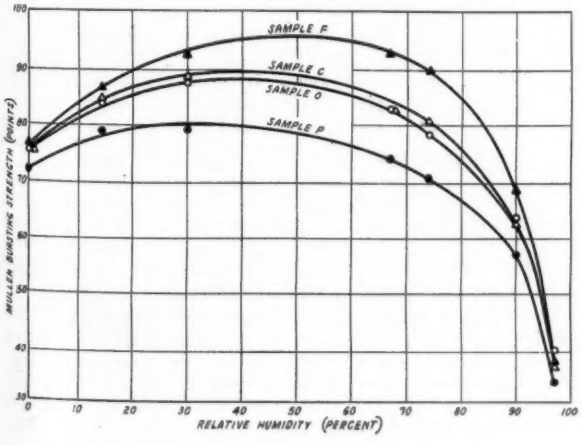


FIG. 3.

The bursting strength-relative humidity relation.

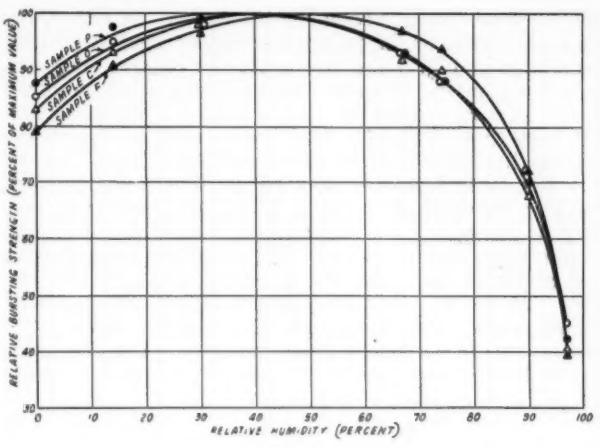


FIG. 4.

Relative bursting strength-relative humidity relation.

to the normal variation of humidity in the room. The curve is rising so rapidly that a slight difference in relative humidity would make a very large difference in moisture content.

The foregoing data show plainly that specifications stating the relative humidity at which a sample shall be tested are subject to a large error unless the way in which that relative humidity shall be approached is designated. The importance of this error is made clear in the subsequent sections of this report.

Simple Relative Humidity, Moisture Content, and Strength Relations

The observations made in connection with the moisture determinations should be kept in mind when considering the strength of samples taken from one relative humidity to a number of other relative humidities. The data showing the behavior of sheets so treated are recorded in table III.

TABLE III
VARIATION OF MOISTURE CONTENT AND BURSTING STRENGTH OF CONTAINER BOARDS WITH RELATIVE HUMIDITY

	First seasoning*		Second seasoning**			Drying***
Sample	Moisture content	Average bursting strength	Relative humidity	Moisture content	Average bursting strength	Average bursting strength
	Percent	Points	Percent	Percent	Points	Points
O	5.0	88	14	3.6	84	75
P	5.1	81	..	3.7	79	68
C	5.5	91	..	3.5	85	74
F	5.4	91	..	3.3	87	73
O	5.5	89	67	10.5	83	73
P	5.2	78	..	10.4	74	70
C	5.3	89	..	10.3	83	77
F	5.1	90	..	10.1	93	77
O	5.5	86	74	11.4	78	76
P	5.0	79	..	11.8	71	72
C	5.3	90	..	11.7	81	75
F	5.4	93	..	12.1	90	77
O	5.2	85	90	18.0	64	75
P	5.4	77	..	18.4	57	77
C	5.2	88	..	18.3	63	76
F	5.6	92	..	19.9	69	75
O	5.1	89	97	27.8	40	75
P	4.9	80	..	29.7	34	73
C	5.5	86	..	30.3	37	75
F	5.4	92	..	35.8	38	77

* 24 to 48 hours at 30 percent relative humidity.
** 24 to 48 hours at the relative humidity noted.
*** Relative humidity and moisture content 0 as a result of 2 hours at 215 to 220 degrees F.

Bursting Strength and Relative Humidity

The variation of bursting strength with relative humid-

ity is shown graphically in Figs. 3 and 4. In Fig. 3, the bursting strengths in points are plotted against relative humidity; in Fig. 4 the values are the relative strengths, calculated on the basis of the maximum strength found as 100 per cent. This results in a form but slightly different from that of Fig. 1, where the strength at 65 per cent relative humidity is taken as the reference point.

From these figures it may be noted that the strength varies relatively little between 25 and 65 per cent humidity; the strength is still about 95 per cent of the maximum at the limits of this range. On the other hand at zero and at 80 per cent humidity the strength is only 80 to 90 per cent of the maximum, while above 80 per cent humidity the strength falls off very rapidly—down to 40 per cent at 97 per cent relative humidity. The maximum in the kraft curve (sample F) appears to come at about 50 per cent relative humidity, while the maxima of the other curves come near 40 per cent. Additional tests between 30 and 65 per cent relative humidity would fix these maxima more accurately.

Bursting Strength and Moisture Content

The bursting strengths and the relative bursting strengths are plotted against the moisture content of the samples in Figs. 5 and 6, respectively. The maxima in the curves are much sharper here than in the two preceding figures. The absence of experimental points at the maxima is quite as serious here as in the other curves.

The kraft sheet reaches its maximum strength at a somewhat higher moisture content than do the others (8 per cent as against 6 per cent). By displacing the curve for the kraft sheet (sample F) in Fig. 6 to the left by 2 per cent throughout its length, it is brought into very good agreement with the other curves. This suggests that all sheets fall off from their bursting strength maximum at the same rate with change of moisture content. If this is true it might be possible, knowing the moisture content at maximum strength, to predict the strength of the sheet at any moisture content.

Temperature Effect

To determine the effect of a change of temperature comparative tests were made at 65 per cent relative humidity at 80 and 72 deg. F. The results are set forth in Table IV. Three sheets each of samples F, P, and O were used for these tests. They were seasoned at 97 per cent relative humidity between the heating and cooling tests, so that the cooling was along the upper (desorption) curve.

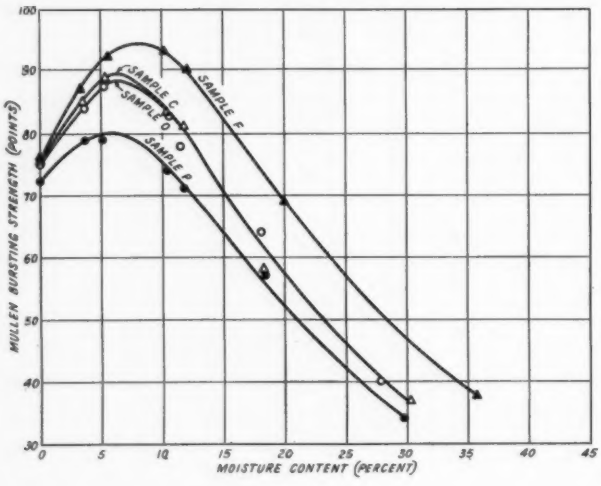


Fig. 5.
The bursting strength-moisture content relation.

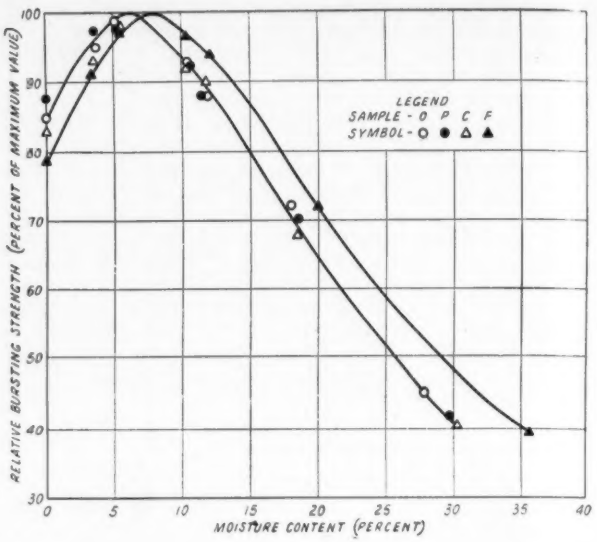


Fig. 6.
Relative bursting strength-moisture content relation.

The moisture content is somewhat higher at 80 than at 72 degrees. This agrees, both in direction and magnitude with the results of McKee and Shotwell (*9*) (*10*), but is contradictory to most data on this point (*12*). On cooling, the strength increased with decreased moisture content, but on warming it increased with increased moisture content in two cases out of three. Most of the differences observed are, in any event, scarcely beyond the experimental error of the present work.

TABLE IV
VARIATION OF MOISTURE CONTENT AND BURSTING STRENGTH WITH TEMPERATURE AT CONSTANT RELATIVE HUMIDITY

Sample	Heating				Cooling			
	65 per cent relative humidity at 72 deg. F.		65 per cent relative humidity at 80 deg. F.		67 per cent relative humidity at 79 deg. F.		65 per cent relative humidity at 70 deg. F.	
	Moisture content Percent	Bursting strength Points	Moisture content Percent	Bursting strength Points	Moisture content Percent	Bursting strength Points	Moisture content Percent	Bursting strength Points
F	9.7	93	10.2	96	12.7	92	12.4	102
P	9.6	74	10.3	76	12.2	76	12.4	81
O	9.6	83	10.1	81	12.1	83	11.7	86

Hysteresis Effects

Strength and moisture-content values for a complete hysteresis cycle of sample C are recorded in Table V. The strength values are presented graphically in Figs. 7, 8, and 9. These figures also include data for the same sample taken from the second series of tests.

As would be expected, since the conditions were nearly identical, the data from the second series of tests agree very well with those of Table V for the first adsorption. It has been shown that the moisture content on desorption is greater than that on adsorption, at any relative humidity. It has also been shown that, during adsorption, strength varies regularly with moisture content. For the reasons noted in the discussion of moisture hysteresis, the moisture content values, and hence the strength values

for the first adsorption recorded in Table V, starting from 15 per cent relative humidity, would be expected to fall between the values obtained for a complete hysteresis cycle. On this basis, the complete cycle should be somewhat as shown by the broken lines of Fig. 7. Obviously the actual facts are much different. The complete hysteresis loop does not follow at all well the predicted course.

TABLE V

HYSTERESIS IN THE MOISTURE CONTENT AND BURSTING STRENGTH FOR ONE SAMPLE OF CONTAINER BOARD

	Relative humidity	Average bursting strength	Average moisture content
	Percent	Percent	Percent
Initial desorption	14	84	3.6
First adsorption	28	89	5.1
	65	79	10.0
	75	82	11.7
	92	64	17.2
	96	45	25.9
First desorption	90	57	21.0
	74	74	15.2
	64	88	11.1
	30	95	6.1
	18	89	3.8
	0	79	0.0
Second adsorption	16	89	2.5
	30	97	4.8
	63	94	8.2
	75	86	11.5
	90	63	18.2
	97	50	24.3

The plotting of the strength against moisture content in Fig. 8 shows the same behavior. At the high moisture content values the curves coincide, but at the point of maximum strength there is a 10 per cent difference between the first and second adsorption curves.

The relative bursting strengths are plotted against moisture content in Fig. 9, from which it can be seen that these values all fall on one curve. This means that there is a regular proportionality between the strengths at different moisture content values, regardless of what these strengths may actually be. In other words, for this sample, the ratio of strength at any moisture content to the maximum strength is independent of the value of the maximum strength and also of the way in which the particular moisture content in question is reached. A consideration of this in connection with some of the newer theories of paper strength (*2*) is of much interest.

From the practical point of view, the difference in strength of 10 per cent between the first and second adsorption curves is important. It may be possible that

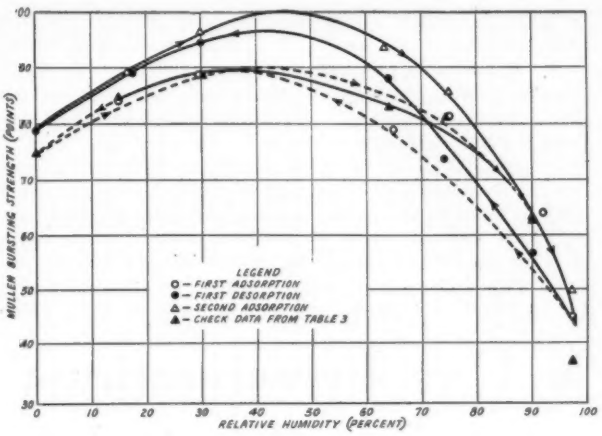


FIG. 7.

The bursting strength-relative humidity relation, showing hysteresis.

the observed behavior is due to the relieving, at high humidities, of stresses set up when the sheets are initially dried under tension on the machine. This could readily be determined by means of test sheets dried under various conditions. Or, the stresses may be those set up in calendering or elsewhere. The thought follows at once that interesting results might be reached by seasoning at high humidity. The advantages of drying under controlled tension are already known from the Briner and Guild patent disclosures (*1*) (*11*).

The difference in strength between the final adsorption and desorption curves at 65 per cent relative humidity is also rather more than the normal allowable variation in test results, an important fact from the control and research standpoint.

Conclusions

1. Both the moisture content and the bursting strength of container boards change with relative humidity in a regular way, and they exhibit hysteresis as the relative humidity is changed through a complete cycle.

2. Maximum bursting strength values are attained at a moisture content corresponding roughly to 40 per cent

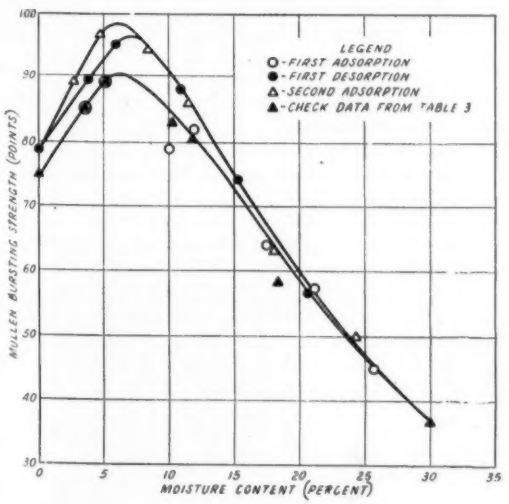


FIG. 8.

The bursting strength-moisture content relation, showing hysteresis.

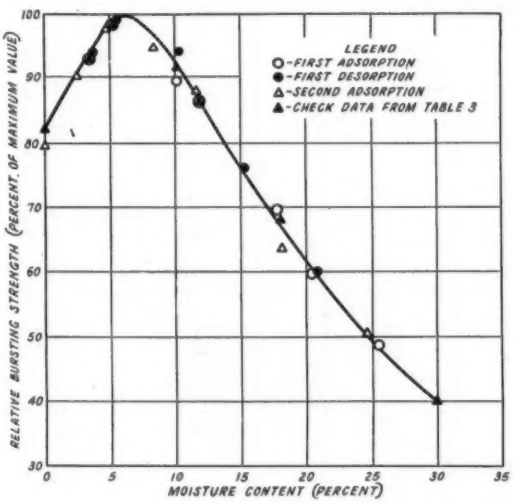


FIG. 9.

The bursting strength-moisture content relation, showing hysteresis.

relative humidity on adsorption and 30 per cent on desorption.

3. Between 25 per cent and 65 per cent relative humidity the bursting strength falls off only about 5 per cent from the maximum values; outside this range the loss of strength becomes serious.

4. Calculating strength to a relative basis, in percentage of a maximum, and relating this to the moisture content rather than to the relative humidity inducing that moisture content, gives a uniform basis for comparing various sheets and conditions of humidity.

5. The moisture content at which maximum strength is reached is a characteristic of the furnish of the sheet.

6. Bringing the sheets to a high humidity brings about a marked permanent increase of strength.

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X-Ray Investigations of The Penetration Of Electrolytes Into Wood

By L. Thomassen[1] and D. W. McCready[2]

Abstract

Open grained spruce wood, samples were submerged in a caustic soda solution for a period, following which they were weighed and X-ray photographs of them were taken.

Penetration was found to be more rapid in summer wood than in spring wood.

The penetration of the solutions of caustic soda into wood was greater than was the penetration of water.

The caustic soda penetration was more rapid at 132 deg. C. than at 95 deg. C.

The rates of operation of many processes in chemical industries depend upon the rates of diffusion of substances through solids. Examples of such processes are those involving extractions, drying and impregnation. In other processes, where chemical reactions are involved, the rates of reaction may depend upon the rates of diffusion of reagents to and reaction products from the loci of the points at which chemical attack takes place. The cooking of wood for the production of cellulose is a process of the latter type. The purpose of this article is to point out that many of these operations may be studied by means of X-rays. Some preliminary studies have been made in the case of wood.

The principle of the method is very simple, as it is based on the fact that X-rays are absorbed differentially in different substances. This method has been utilized by the medical profession for many years for making radiographic pictures. It is proposed to utilize this method for ascertaining the rate of diffusion of materials through solids by taking a series of X-ray photographs of the solid and measuring the movement of the interface of the material through the solid. This is a kinetic method.

Information on the same process might of course also be gained by other methods such as chemical analysis, but in many cases the proposed procedure will be more rapid and accurate. It also has the advantage that it might be possible to follow a reaction without interfering with the operating conditions, even when these change very rapidly since X-ray pictures under favorable conditions may be taken with a speed comparable to that of moving pictures.

Theoretical Considerations

The absorption of X-rays follows in the equation

$$I = I_0 e^{-\frac{\mu}{\rho}\rho x}$$

Here I_0 is the intensity of the impending radiation, I the intensity after absorption in a thickness x, μ is the absorption co-efficient of the material, ρ is the specific gravity of the material under investigation, and e is the base of the natural logarithms. The reason for ρ appearing both in numerator and denominator is that by dividing by ρ the so-called mass absorption coefficient μ/ρ becomes independent of the state of aggregation in which the absorber occurs. For chemical compounds or mechanical mixtures μ/ρ is found according to the following formula: Let the composition contain p_1 per cent by weight of the element A of mass absorption μ_1/ρ_1, p_2 per cent of the element B of mass absorption μ_2/ρ_2 etc., then

$$\frac{\mu}{\rho} 100 = \frac{\mu_1}{\rho_1} p_1 + \frac{\mu_2}{\rho_2} p_2 + \text{——}$$

To bring about a difference in photographic density at the interface of diffusion it is evidently necessary to have a difference in absorption coefficients between the solid and the solid-diffusing material mixture. The higher the voltage used in the X-ray tube the greater will be the

* Presented at the fall meeting of the Technical Association of the Pulp and Paper Industry, Appleton, Wis., September 26-28, 1933.
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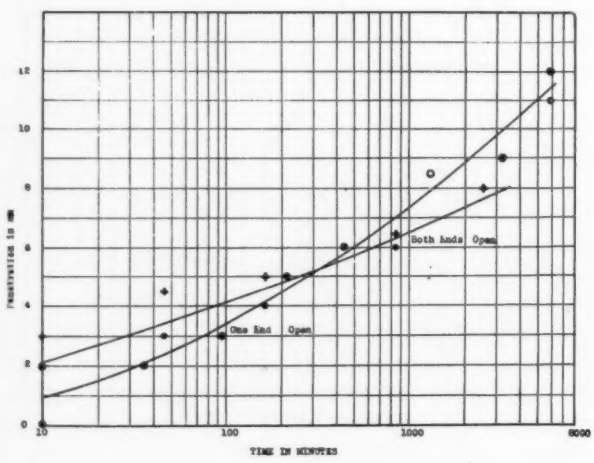

FIG. 1.

penetrative power of the X-rays, but at the same time the difference between the absorption coefficients of the materials will decrease, in other words the difference between the blackenings on the photographic plate will decrease. This may be seen from Table 1 in which the values of the mass absorption coefficients of water, wood and a 5 per cent solution of NaOH in water are given. The values are based on Jönsson's work as given by Kirchner (*1*). The voltages assumed are 20,000, 25,000 and 30,000 volts (peak) which will give a maximum of general radiation roughly at respectively 0.81, 0.64 and 0.53 Angström units.

From the absorption formula it will be seen that the intensity of radiation will depend equally on μ/ρ as on ρ. Since the density of summer wood is greater than that of spring wood, the structure of the wood is brought out very clearly as shown in Figures 2 and 3.

Experimental Part

Studies of penetration of electrolytes into wood have been carried out by Maass and his collaborators (*2*).

The experiments to be treated in this article were carried out in the following manner. Open grained, well dried white spruce wood was sawed up into small blocks of rectangular shape, 1¼ x 1¼ x 1¼ inches, 1½ x 1½ x 1½ inches, or 2 x 2 x 4½ inches, with the grain parallel to one edge. These blocks were suspended in the penetrating liquid for various intervals, taken out, weighed and photographed by means of X-rays, the beam of X-rays was shot parallel to the moving front of the electrolyte. The wood blocks were then returned to the liquid for another interval. The distance of travel of the liquid into the blocks was measured on the films.

The following experiments were performed: (a) Penetration of water at 18 deg. C. into blocks which were coated with shellac on the four sides parallel to the grain of the wood. In one set of experiments one of the sides of the blocks perpendicular to the grain of the wood was similarly coated and in others both of these sides were uncoated. (b) Penetration of a 5 per cent solution of sodium hydroxide in water at 95 deg. C. and (c) Penetration of a 5 per cent solution of sodium hydroxide at 132 deg. C. in a pressure vessel.

In experiments (b) and (c) all sides were open since no satisfactory protective coating could be found that would resist the action of the sodium hydroxide solutions.

The results of the experiments with water penetration are given in Tables II and III and graphically in Fig. 1. As will be seen the rate of penetration after about an hour seemed to be more rapid in the samples where only one end was open. While this result might be accidental, the increase in weight of the samples (not given here) agreed quite well with the penetration curves. As will be seen from the curves, the rate of penetration became rather slow as soon as the water front had moved into the block two or three millimeters (⅛ inch). The time for a penetration of 6 millimeters (¼ inch) was about 500 minutes, which is a very slow rate.

The penetration curves for caustic solutions are not given since the individual rates varied considerably for the four blocks investigated at 95 deg. C. and for the two blocks at 132 deg. C. Exposures typical of those obtained, are shown in Figs. 2, 3 and 4. In Fig. 2 the beam of X-rays was parallel to the axis of the tree, in Fig. 3 tangential and in Fig. 4 radial. The distance of penetration of the caustic solution into the block was about 7 millimeters after 40 minutes at 95 deg. C. so that the rate of penetration of caustic solutions into wood is much greater than for water. The rate of penetration of caustic solutions was much more rapid at 132 deg. C than at 95 deg. C.

The exposures also show the difference in rates of penetration into the various parts of the wood. This is shown in Fig. 3 which indicates that the spring wood is penetrated slower than the summer wood.

Investigations of the penetration of electrolytes into pre-soaked wood would be quite feasible by this method, and experiments along these and similar lines are in progress.

The experimental work was done by Allen P. Lu, who unfortunately did not have the opportunity to carry these experiments as far as could be desired.

TABLE I

MASS ABSORPTION COEFFICIENT $\frac{\mu}{\rho}$ FOR VARYING VOLTAGES

Material	20,000 Volts	25,000 Volts	30,000 Volts
Water	1.7	0.9	0.5
5 percent NaOH Solution	1.8	1.0	0.5
Wood (50 percent C, 44 percent O, 6 percent H)*	1.2	0.7	0.4
	1.2	0.7	0.4

* Hawley and Wise, The Chemistry of Wood, New York, 1926.

TABLE II

PENETRATION OF WATER IN WOOD, ONE END OPEN

Time in minutes	Distance of Penetration in mm. Large block 1½x1½x1½ ins.	Small block 1¼x1¼x1¼ ins.
10	0	2
35	2	2
95	3	3
215	5	5
455	6	6
1535	8.5	8.5
3215	9	9
5885	10	12

TABLE III

PENETRATION OF WATER IN WOOD, BOTH ENDS OPEN

Time in minutes	Distance of Penetration in mm. Large Block 1½x1½x1½ ins.	Small Block 1¼x1¼x1¼ ins.
10	2	3
45	3	4.5
165	4	5
825	6	6.5
2505	8	8

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FIG. 2.

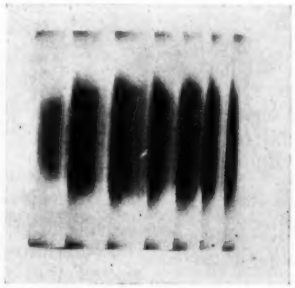

FIG. 3.

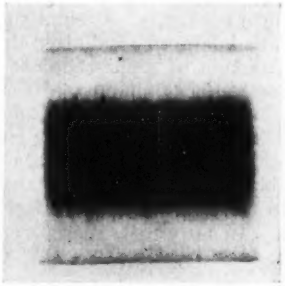

FIG. 4.

The Relation Between Hydration Capacity and Pentosan Content of Soft Wood Pulps

By George H. Young [1] and B. N. Rowland [2]

Abstract

The relation between swelling tendency and pentosan content of a number of soft wood pulps has been studied intensively.

It has been experimentally established that this relationship is approximately linear.

Our results tend to substantiate the theory that adsorption is a function of secondary valence forces in the micelle.

Further studies are planned to establish a similar relationship in the case of hard wood pulps.

Various attempts to correlate the physical properties of cellulose with its structure have been made during the past decade. In particular, attempts have been made to account for the changes taking place on beating in terms of colloidal behavior. Macdonald *(1)*, Strachan *(2)*, Rutz *(3)*, Kress *(4)*, and others have shown that there is a relation between the beating characteristics of various pulps and the colloidal phenomenon of water absorption. This is to be expected since beating is accompanied by swelling of the fibers and the formation of hydro-gels. In addition to these colloid studies, attempts have been made to correlate beating characteristics with the usual chemical constants determined on pulps. Until the time of this writing no clear relationship has been established. Schwalbe *(5)*, as early as 1911, found that prolonged beating, with the contingent high degree of hydration, increased the absorption of copper from cold Fehling's solution, to give a high cellulose number. Nakano *(6)* studied the relationship between beating and copper number. While he found a slight increase in copper number with increased beating time, he concluded there was no direct relation, and that the phenomenon was a secondary effect of beating. Kress and Bialkowsky (*4*) also studied the effect of beating on chemical properties, and concluded that hydration was accompanied by no material change in these properties. No attempt was made to relate beating phenomena with the original chemical structure or properties of the pulp. Grogan *(7)* has recently pointed out a possible relationship between the furfural-yielding constituents of bagasse and the so-called hygroscopic coefficient. He observed no relation between this coefficient and other non-cellulose constituents.

Despite the preponderance of opinion that the behavior of cellulose on beating is not directly connected with its chemical structure, it was felt that a possible correlation might be found through direct measurement of swelling tendency, and comparison of this with previously determined chemical constants. Preliminary investigations carried out in this laboratory indicated that swelling tendency was not a function of alpha-cellulose content, which confirms the observations of Kanamaru*(8)* and others. On the other hand, both Grogan*(7)* and Kanamaru*(8)* observed a slight but definite relation between swelling tendency and pentosan content, which is a measure of non-cellulose material probably inherent in the micelle structure. Neither attempted to confirm this observation with further hydration studies. In an effort, therefore, to establish such a relationship, or to clearly prove that none exists, the pentosan content was first selected for study.

The pulps used were selected to offer as wide a range of conditions as possible. Pulps cooked by both the kraft and sulphite processes were studied. For the sake of completeness a commercial groundwood was also included, together with a number of hard wood pulps. Some of the samples selected were laboratory cooks prepared at the Institute of Paper Chemistry; the remainder were regular commercial pulps obtained from neighboring mills or drawn from commercial stock samples available at the Institute.

In this paper are presented the results of this research. Further studies will be directed toward correlation between swelling tendency and non-cellulose constituents of hard wood pulps. The results of these studies, and the relation between swelling tendency and strength developed in beating, will be made the basis of a future communication.

Theory of Hydration

Gesell and Minor*(9)* consider hydration to be a process of bringing the electro-static force-fields of the colloidal cellulose macro-molecule into action, by means of which the negative hydroxyl ions from water or alkali are adsorbed, causing the micelles to swell into a loose gel. This theory is the one generally accepted by colloid chemists.

According to this theory there is a force-field acting about every hydroxyl group in the cellulose macro-molecule. Meyer and Mark*(10)* have pictured for the macra-molecule the following structural formula:

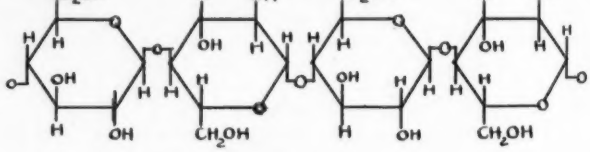

FIG. 1
Cellulose macro-molecule.

The cellulose micelle is considered to be made up of a large number of these chain-like molecules lying parallel and held together by the secondary valence forces acting about the hydroxyl groups along the chain. If, for the sake of simplicity, we consider a micelle made up of only two such chain molecules (see Fig. 2), then the fields of greatest secondary valence force are about the two adjacent hydroxyl groups of the two chain molecules, as shown.

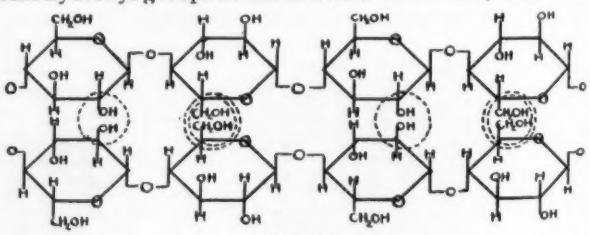

FIG. 2
Skeletonized cellulose micelle.

From purely chemical considerations it would be expected that the greatest force-field exists about the two adjacent primary hydroxyls along the parallel chains, and a somewhat less strong force-field about adjacent secondary

RECEIVED APRIL 14, 1933.
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hydroxyl groups. (The fields of greatest force are indicated in Fig. 2 by a double boundary around the groups involved.) This is based on the fact that in simple organic molecules primary hydroxyls have a stronger negative influence than do secondary and tertiary; that is, the residual or secondary valence force about a primary hydroxyl are stronger than those about a secondary hydroxyl.

When it is remembered that the hydroxyl ions themselves bear a negative charge, it will be seen that there should be a relatively greater resistance offered to their ingress into the "primary" force-field indicated in the skeletonized cellulose micelle than should be offered by the "secondary" force-field. If, then, the number of "primary" force-fields can be in some way reduced, we should expect to find hydroxyl ion adsorption taking place with relatively greater ease.

In wood pulps and to a lesser extent in rag stocks, the anhydro-glucose units making up the cellulose chain are believed to be interspersed with non-cellulose or hemi-cellulose units. In general, these hemi-cellulose units may consist of uronic acids, or may be derived from pentose (5 carbon) sugars such as xylose, rather than from hexose sugars (glucose, mannose, or galactose). Fig. 3 shows a hypothetical chain molecule having pentose and uronic acid groups interspersed with the anhydro-glucose units.

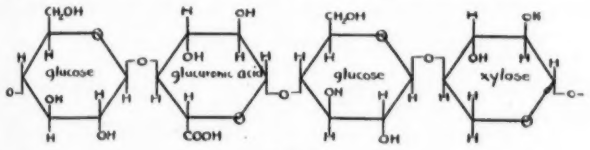

FIG. 3
Modified cellulose macro-molecule.

Referring again to Fig. 2, if one or both of the adjacent primary hydroxyl groups on an anhydro-glucose unit is removed, a localized force-field should result which is relatively less negative than the original field, and should resist less strongly the entrance of negative ions. The presence of pentosans (polymerized pentose sugars) in the cellulose macro-molecule should produce, in effect, the same phenomena as would result were we able to actually sever the primary hydroxyl from the anhydrous-glucose unit. Fig. 4 illustrates the possible force-fields existing in a skeletonized micelle containing interspersed pentose units.

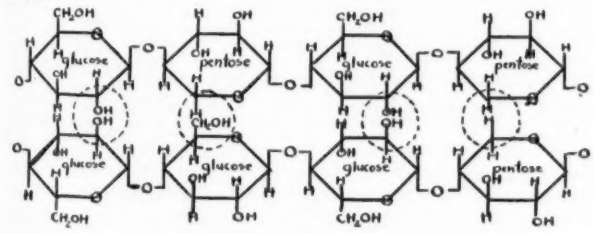

FIG. 4
Modified cellulose micelle.

By means of swelling tendency, or the tendency of pulp to adsorb water and increase in volume when it is allowed to come in contact with water, it is possible to obtain a relative measure of the ease with which negatively charged hydroxyl ions enter into the cellulose micelle. These values should bear a linear relationship to the pentosan content of the individual pulps, and we have found this to be so, in the case of pulps derived from soft woods. The relationship does not appear to be so marked in the case of hard wood pulps.

The experimental methods used, and the data which were obtained, are herewith presented.

Experimental Methods

The dilatometer used for measuring the swelling ability of the various pulps was that designed by one of us, and described in a previous communication from this laboratory *(4)*. It consists essentially of a column of mercury against which the sample of pulp is allowed to press as its volume increases with water adsorption. The mercury is displaced through a capillary opening as the volume of the pulp increases, and is collected and weighed directly. The amount of mercury displaced is a direct measure of the volume increase of the pulp sample.

Approximately 2.4 grams of shredded, air dry pulp are compressed into a tared annular ring having an inside diameter of 1 inch and a thickness of 3/16 inches, at a pressure of 10,000 pounds per square inch. The ring is then weighed and the exact amount of pulp contained is taken by difference. After carefully leveling the mercury in the dilatometer vessel the ring containing the compressed sample is placed in position, the mercury adjusted to the tip of the capillary, and 25 cc. of distilled water are added. The amount of mercury displaced at the end of 5, 10, 15, 30, 45, and 60 minutes is determined by collecting it in a small tared beaker and weighing. The increase in volume is then expressed in terms of the original volume. Under the above experimental conditions, the density of the pulp is approximately 1.0 grams per cc.

Curves showing the relation between the volume-changes and time are given in Fig. 5. Swelling ability is expressed in per cent increase in volume, and the time in minutes.

Pentosan determinations were made on the various pulps, using the Forest Product Laboratory Method No. 45 *(11)*. Tabulated results of the pentosan determinations together with the corresponding total swellability for each of the soft wood pulps are given in Table I. The relation between swellability and pentosan content is shown graphically in Fig. 6.

TABLE I

COMPARISON BETWEEN PENTOSAN CONTENT AND SWELLABILITY OF SOFT WOOD PULPS.

Pulp Description	Pentosan Content	Swellability Predicted	Swellability Observed
No. 1 Alpha (1)	2.4%	39.0%	42.0%
Blch. Sulphite (a)	4.5	50.0	54.0
Blch. Sulphite (b)	4.7	53.0	57.0
Blch. Sulphite (c)	6.7	60.0	57.5
Unbl. Sulphite (d)	6.9	61.0	58.0
Unbl. Mitscherlich (2)	6.9	61.0	60.5
Unbl. Sulphite (e)	7.4	63.0	57.5
Blch. Swedish Kraft (3)	10.8	82.0	63.5*
Unbl. Kraft (4)	10.9	83.0	79.0
Groundwood (spruce) (5)	11.6	88.0	87.5
Blch. Sulphite (f)	11.7	90.0	93.0
Southern Kraft (6)	12.6	97.0	96.0

Tabulated results of pentosan determinations on hard wood pulps together with the observed swellability are given in Table II. These results are presented for comparison only, and represent a preliminary study on hard wood pulps which will be more intensively pursued in the future.

Discussion of Results

In general, it will be seen that the swelling tendency of soft wood pulps increases with increase in pentosan content of the original pulp. Our experiments clearly indicate that the relation is linear, or nearly so. These results confirm the earlier observations of Grogan *(7)* and Kanamaru *(8)*, and further substantiate the hypothesis that adsorption is a function of secondary valence in the cellulose micelle. Referring to Table I and Fig. 6, it will be seen that the swelling tendency as determined by dilatometer measurements is in very fair agreement with that which would be predicted on the basis of pentosan content. In only one case has the experimentally determined value fallen entirely outside the limit of possible experimental error. This pulp (see Table I) had an actual swellability

of 63.5 as compared with 82.0 predicted for it on the basis of its experimentally determined pentosan content. The pulp was a highly bleached kraft sample of Swedish manufacture. In actual characteristics it more nearly represents an alpha pulp than a kraft, with the exception of pentosan content. As would be predicted from the swellability, it hydrates in the beater with difficulty and develops comparatively low strength.

The study has suggested a number of refinements in the dilatometer which was used; these changes in design are being incorporated in a new instrument with which more accurate measurements of swelling tendency, and particularly of the rate of swelling, can be made.

In addition, it should be pointed out that the accepted method for the determination of pentosan, by distillation with 12 per cent hydrochloric acid and precipitation of the resulting furfural with phloroglucinol, is in itself subject to appreciable experimental error. A series of pentosan determinations on a single pulp have been known to give values varying as widely as a half to one per cent from the average of a number of individual determinations.

In the ultimate analysis, the principal factor which should determine the inherent accuracy of the relationship between swelling ability and pentosan content is the presence to a greater or less degree of other non-cellulose units in the chain molecule which are not true pentosans, but which yield furfural and hydroxyl methyl furfural on distillation with hydrochloric acid. Glucuronic acid, a partially oxidized glucose unit, is itself capable of yielding furfural *(12)*. The relationship is further complicated by variation in configuration of the pentoses which are grouped together as "pentosans". Such differences in configuration can materially alter the force-fields along the cellulose chain, and will largely determine the relative ease of negative ion adsorption. In a theoretical micelle containing only anhydro-glucose and xylose units, the linear relationship between the percentage xylosan and swelling tendency would probably be exact. Actually determined values will differ from predicted to just the extent that actual cellulose differs from theoretical. It seems reasonable to suppose that the results on the bleached kraft sample mentioned above represent an extreme example of the effect of such complicating factors.

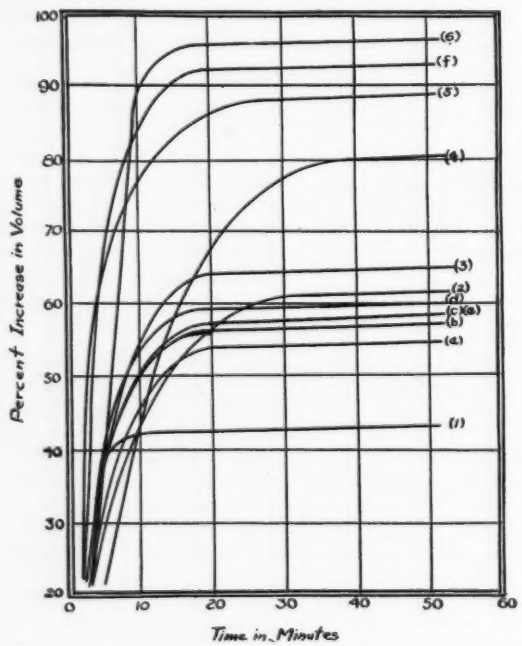

FIG. 5
Volume increase with time.

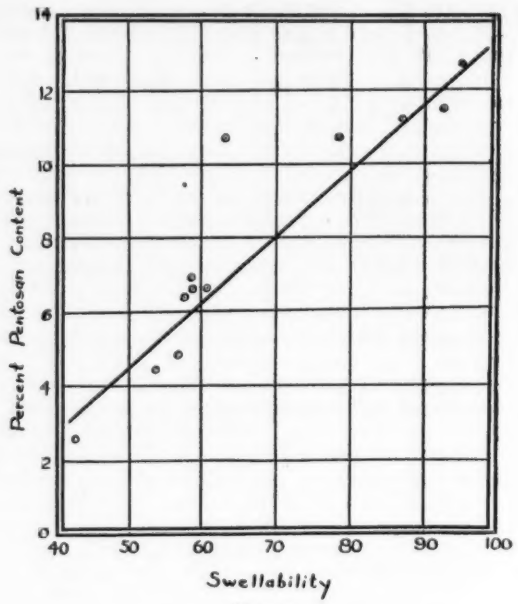

FIG. 6
Relation between swellability and pentosan content.

It is interesting to note that the relationship between pentosan content and swellability (see Table II) in the case of hard wood pulps is not so marked. While our data are incomplete, further study may show that there are measurable interfering factors which more or less inhibit adsorption. On the basis of pentosan content alone, we would expect to find the swelling tendency of hard wood pulps considerably greater than that of soft wood pulps. Preliminary determinations have shown, however, that this is not the case. A hard wood pulp having a pentosan content of approximately twice that of a given soft wood pulp will have roughly the same swelling tendency as the latter. It is probable that the manner in which the pentosan material is combined in cellulose derived from hard woods differs from that in pulp derived from soft woods. Until sufficient data have been collected, we can venture no further than to point out the possibility that this may account for the apparent discrepancy. An intensive study, using a wide variety of hard wood pulps, should help to clarify this point.

TABLE II

COMPARISON BETWEEN PENTOSAN CONTENT AND SWELLABILITY OF HARD WOOD PULPS.

Pulp Description	Pentosan Content	Swellability Predicted	Swellability Observed
No. 3 Blch. Soda	14.8%	45.0%	64.0%
Comm. Blch. Soda (a)	17.6	63.0	62.0
No. 10 Blch. Soda	18.6	71.0	71.0
No. 5 Blch. Soda	19.0	75.0	65.0
Comm. Blch. Soda (b)	19.1	76.0	61.0
No. 17 Unbl. Soda	19.1	76.0	78.0
No. 14 Blch. Soda	19.7	82.0	81.5
Comm. Blch. Soda (c)	22.1	97.0	82.5

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[3] Rutz, G. Papier-Fabr. 30, no. 49; 704-6 (1932).
[4] Kress, O. and Bialkowsky, H. Paper Trade J. 93, no. 20; TS 35-44 (1931).
[5] Schwalbe, G. C. Chemie der Cellulose; 634 (1911).
[6] Nakano, M. Cellulose Ind. 6; 75 (1930).
[7] Grogan, H. L. J. Soc. Chem. Ind. 52, no. 9; 63-4 T (1933).
[8] Kanamaru, K. Cellulose Ind. 7; 3-13 (1931).
[9] Gesell, W. H., and Minor, J. E. Paper 24, no. 12; 15-19 (1929).
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[11] Bray, M. W. Methods Used at the Forest Products Laboratory, August, 1928. p. 28.
[12] Franken, H. Biochem. Z. 257, no. 4-6; 245-55 (1933).

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING OCTOBER 7, 1933

CIGARETTE PAPER

Champagne Paper Corp., Schodack, Bordeaux, 157 cs.; American Tobacco Co., Schodack, Bordeaux, 450 cs.; American Tobacco Co., Manhattan, Havre, 350 cs.; Standard Products Corp., Lafayette, Havre, 119 cs.

WALL PAPER

——, Manhattan, Havre, 10 cs.; S. K. Lonegren, Kungsholm, Gothenburg, 1 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., American Merchant, London, 3 bls.

NEWS PRINT

W. H. Bell, Markland, Liverpool, N. S., 5677 rolls; Jay Madden Corp., City of Fairbury, Kotka, 827 rolls; Dunham & Reeve, City of Fairbury, Kotka, 195 rolls; ——, Bergensfjord, Oslo, 499 rolls; Perkins Goodwin & Co., A. Ballin, Hamburg, 211 rolls; Parsons & Whittemore, Inc., A. Ballin, Hamburg, 145 rolls.

PRINTING PAPER

International F'd'g. Co., Pennland, Antwerp, 4 cs.; P. C. Zuhlke, Pennland, Antwerp, 12 cs.; Senefelder, Inc., Milwaukee, Hamburg, 23 cs.; Phoenix Shipping Co., A. Ballin, Hamburg, 9 cs.

WRAPPING PAPER

F. C. Strype, Pennland, Antwerp, 1 cs.; Scharff Bros., American Merchant, London, 6 cs.; ———, Manhattan, Hamburg, 12 cs.

FILTER PAPER

H. Reeve Angel & Co. Inc., Majestic, Southampton, 12 cs.; H. Reeve Angel & Co. Inc., American Merchant, London, 12 cs.

DRAWING PAPER

H. Reeve Angel & Co. Inc., American Merchant, London, 3 cs.

TISSUE PAPER

B. F. Drakenfeld & Co., Georgic, Liverpool, 1 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Pennland, Antwerp, 22 cs.; ——, A. Ballin, Hamburg, 5 cs.; Globe Shipping Co., A. Ballin, Hamburg, 6 cs.

METAL COATED PAPER

Taub Hummell & Schnall, Manhattan, Hamburg, 1 cs.; K. Pauli Co., A. Ballin, Hamburg, 13 cs.; Globe Shipping Co., A. Ballin, Hamburg, 13 cs.

COATED PAPER

Chas. Happel, A. Ballin, Hamburg, 3 cs.

PHOTO PAPER

American Express Co., A. Ballin, Hamburg, 26 cs.

CARBON PAPER

American Express Co., A. Ballin, Hamburg, 3 cs.

COLORED PAPER

W. Bersch, A. Ballin, Hamburg, 4 cs.

DECALCOMANIAS

Sellers Transportation Co., Bremen, Bremen, 27 cs.; Sellers Transportation Co., A. Ballin, Hamburg, 4 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Georgic, Liverpool, 30 cs. (duplex), B. F. Drakenfeld & Co., Georgic, Liverpool, 7 cs. (simplex).

TRANSFER PAPER

Rohner Gehrig & Co., Bremen, Bremen, 9 cs.; Atlantic F'd'g. Co., A. Ballin, Hamburg, 21 cs.

COVER PAPER

International F'd'g. Co., A. Ballin, Hamburg, 3 cs.

ENVELOPES

Gevaert Co. of America, Pennland, Antwerp, 1 cs.; Beckhard Simfred Co., A. Ballin, Hamburg, 2 cs.

WRITING PAPER

Meadows Wye & Co., American Merchant, London, 3 cs.

PAPER BOARD

Colmar Paper Corp., Pennland, Antwerp, 15 cs.

CARD BOARD

Rohner Gehrig & Co., Majestic, Southampton, 6 cs.; E. Dietzgen & Co., American Merchant, London, 2 cs.

STRAW BOARDS

Famous Paper Box Co., Volendam, Rotterdam, 601 pkgs.

MISCELLANEOUS PAPER

T. N. Fairbanks, Tai Ping, Yokohama, 2 cs.; Keuffel & Esser Co., Manhattan, Hamburg, 16 cs., 33 rolls; E. Fougera & Co., Lafayette, Havre, 65 cs.; Keller Dorian Paper Co., Lafayette, Havre, 2 cs.; A. W. Fenton, Inc., Lafayete, Havre, 9 cs.; The Borregaard Co. Inc., Kungsholm, Gothenburg, 49 bls., 300 rolls; Kraemer & Co., Kungsholm, Gothenburg, 166 bls.; American Express Co., A. Ballin, Hamburg, 2 cs.; Corn Exchange Bank Trust Co., Montreal Maru, Kobe, 3 cs.

RAGS, BAGGINGS, ETC.

——, E. Francqui, Antwerp, 165 bls. bagging; G. W. Millar Co. Inc., Fred. VIII, Oslo, 33 bls. new cuttings; ——, Navemar, Leghorn, 50 bls. rags; Darmstadt Scott & Courtney, Navemar, Barcelona, 36 bls. rags; Darmstadt Scott & Courtney, Navemar, Barcelona, 64 bls. bagging; O'Brien Padawer, Inc., Navemar, Barcelona, 188 bls. rags; S. Birkenstein & Son, Navemar, Barcelona, 364 bls. rags; Darmstadt Scott & Courtney, Black Heron, Rotterdam, 59 bls. bagging; J. Cohen Son & Co. Inc., American Merchant, London, 12 bls. rags; ——, Quaker City, Leith, 90 bls. bagging; ——, Quaker City, Dundee, 300 bls. paper stock; G. W. Millar Co. Inc., Coelleda, Manchester, 134 bls. rags; E. J. Keller Co. Inc., Estrella, ——, 131 bls. rags; Philadelphia Nat'l Bank, Estrella, Barcelona, 448 bls. rags; E. Butterworth & Co. Inc., Savoia, Genoa, 77 bls. rags; Banco Coml Italiane Trust Co., A. Ballin, Hamburg, 101 bls. jute card waste; Chase National Bank, Sarcoxie,

Havre, 24 bls. cotton waste; Van Oppen & Co., Sarcoxie, Havre, 175 bls. bagging; J. Flannery, Sarcoxie, Dunkirk, 46 bls. rags; D. M. Hicks, Inc., Sarcoxie, Dunkirk, 52 bls. flax waste; Keene & Arkus, Inc., Sarcoxie, Dunkirk, 57 bls. bagging; Hoffman Lion Mills, Montreal Maru, Kobe, 140 bls. rags; Mitsui & Co. Ltd., Montreal Maru, Kobe, 15 bls. rags; E. J. Keller Co. Inc., Montreal Maru, ——, 100 bls. rags; E. J. Keller Co. Inc., De Grasse, ——, 125 bls. bagging; E. J. Keller Co. Inc., New York, ——, 59 bls. rags; E. J. Keller Co. Inc., Exochorda, ——, 256 bls. rags.

GLUE STOCK

——, A. Ballin, Hamburg, 460 bags bone glue.

OLD ROPE

Keene & Arkus, Navemar, Barcelona, 407 coils; W. Steck & Co., Black Heron, Rotterdam, 113 coils; E. J. Keller Co. Inc., Black Heron, ——, 74 coils; Brown Bros. Harriman & Co., Pennland, Antwerp, 72 coils; Banco Coml Italiane Trust Co., Exiria, Genoa, 333 coils; Irving Trust Co., Sarcoxie, Dunkirk, 129 rolls.

CASEIN

D. C. Andrews & Co., A. Ballin, Hamburg, 70 bags.

WOOD PULP

Pagel Horton & Co. Inc., Ditmar Koel, Munksund, 6000 bls. sulphite, 1000 tons; Bulkley Dunton & Co., Ditmar Koel, ——, 2250 bls. wood pulp, 403 tons; J. Anderson & Co., Ditmar Koel, Soderhamn, 665 bls. sulphite, 135 tons; Johaneson Wales & Sparre, Inc., Ditmar Koel, Sundsvall, 5898 bls. sulphite, 1073 tons; Johaneson Wales & Sparre, Inc., Ditmar Koel, Sundsvall, 879 bls. chemical pulp, 177 tons; Johaneson Wales & Sparre, Inc., Ditmar Koel, Sundsvall, 450 bls. sulphite, 75 tons; Mead Sales Co., Ditmar Koel, Sundsvall, 250 bls. chemical pulp, 50 tons; Mead Sales Co., Ditmar Koel, Sundsvall, 250 bls. sulphite, 50 tons; Lagerloef Trading Co., City of Fairbury, Kotka, 135 bls. sulphite, 27 tons; Lagerloef Trading Co., City of Fairbury, Wiborg, 773 bls. sulphite, 154 tons; Lagerloef Trading Co., City of Fairbury, Wiborg, 2620 bls. sulphite, 507 tons; Castle & Overton, Inc., City of Fairbury, Wiborg, 153 bls. wood pulp, 30 tons; Lagerloef Trading Co., City of Fairbury, Helsingfors, 2289 bls. sulphite, 284 tons; Lagerloef Trading Co., City of Fairbury, Helsingfors, 635 bls. mechanical pulp, 127 tons; Perkins Goodwin & Co., Bergensfjord, Drammen, 250 bls. sulphite; E. M. Sergeant & Co., Bergensfjord, Oslo, 300 bls. chemical pulp; M. Sone, Kungsholm, Gothenburg, 813 bls. wood pulp; Johaneson Wales & Sparre, Inc., Kungsholm, Gothenburg, 254 bls. sulphite; E. M. Sergeant & Co., Kungsholm, Gothenburg, 598 bls. kraft soda pulp; Castle & Overton, Inc., A. Ballin, Hamburg, 140 bls. wood pulp, 28 tons; E. J. Keller Co. Inc., Pr. Harding, ——, 698 bls. wood pulp.

WOOD PULP BOARDS

Heidelbach Ickelheimer & Co., Volendam, Rotterdam, 2880 pkgs.; Lagerloef Trading Co., City of Fairbury, Kotka, 47 bls., 7 tons; Lagerloef Trading Co., City of Fairbury, Helsingfors, 280 rolls, 57 tons.

ALBANY IMPORTS

WEEK ENDING OCTOBER 7, 1933

Halifax Power & Pulp Co., Gard, Sheet Harbor, 11066 bls. pulp, 2470 tons; ——, Ditmar Koel, Svano, 300 bls. sulphite; ——, Ditmar Koel, Svano, 300 bls. sulphite; Bulkley Dunton & Co., Ditmar Koel, ——, 6550 bls. wood pulp; Perkins Goodwin & Co., Ditmar Koel, Soderhamn, 3350 bls. sulphite, 670 tons; Johaneson Wales & Sparre, Inc., Ditmar Koel, Sundsvall, 6213 bls. sulphite, 885 tons; Perkins Goodwin & Co., Ditmar Koel, Sundsvall, 5982 bls. sulphate, 1012 tons; Brown Bros. Harriman & Co., Ditmar Koel, Sundsvall, 250 bls. chemical pulp, 50 tons; Amtorg Trading Corp., Gro, Archangel, 2909 cords pulp wood; Bulkley Dunton & Co., Luossa, ——, 2000 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING OCTOBER 7, 1933

D. C. Andrews & Co., Georgic, Liverpool, 4 cs. wrapping paper; ——, Georgic, Liverpool, 81 bls. rags; G. F. Malcolm Inc., Georgic, Liverpool, 16 cs. tissue paper; 1st Nat'l Bank of Boston, American Merchant, London, 249 bls. waste paper; Bank of N. Y. Trust Co., American Merchant, London, 53 bls. waste paper; Crocker Burbank Co., American Merchant, London, 63 bls. waste paper; ——, American Merchant, London, 29 bls. rags; Bulkley Dunton & Co., West Eldara, ——, 140 bls. wood pulp; Gottesman & Co. Inc., Berengar, Finland, 1100 bls. wood pulp; Gottesman & Co. Inc., Malmen, Sweden, 3080 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING OCTOBER 7, 1933

Gottesman & Co. Inc., Innaren, Sweden, 12590 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING OCTOBER 7, 1933

Keene & Arkus, Inc., Schodack, Bordeaux, 322 bls. rags; E. Mayer, Schodack, St. Nazaire, 120 bls. rags; J. W. Hampton, Jr., City of Fairbury, Kotka, 252 rolls news print; Lagerloef Trading Co., City of Fairbury, Kotka, 588 bls. pulpboards, 65 tons; Lagerloef Trading Co., City of Fairbury, Kotka, 260 bls. sulphite, 52 tons; Lagerloef Trading Co., City of Fairbury, Kotka, 127 bls. mechanical pulp, 25 tons; Castle & Overton, Inc., City of Fairbury, Wiborg, 631 bls. sulphite, 125 tons; Lagerloef Trading Co., City of Fairbury, Wiborg, 3077 bls. sulphite, 613 tons; Lagerloef Trading Co., City of Fairbury, Helsingfors, 158 bls. sulphite, 26 tons; Jay Madden Corp., City of Fairbury, Helsingfors, 144 bls. tissue paper; Lagerloef Trading Co., City of Fairbury, Helsingfors, 127 bls. mechanical pulp, 25 tons; Banco Coml Italiane Trust Co., Exiria, Genoa, 91 coils old rope; E. J. Keller Co. Inc., Quaker City, ——, 327 bls. wood pulp, 42 tons; E. J. Keller Co. Inc., Quaker City, ——, 129 bls. rags; Bank of N. Y. Trust Co., Quaker City, Hamburg, 95 bls. rags; ——, Quaker City, Dundee, 13 bls. paper stock; ——, Quaker City, Leith, 170 bls. rags; O. G. Hempstead Co., Quaker City, London, 36 bls. waste paper; Chase National Bank, Quaker City, London, 165 bls. waste paper; H. G. Lichtenstein, Quaker City, Bremen, 223 bls. rags; E. Mayer, Estrella, Marseilles, 54 bls. rags; F. Weber, Savoia, Genoa, 6 cs. drawing paper; F. Weber, Savoia, Genoa, 1 cs. printing paper; Union Waste Co., Montreal Maru, Kobe, 25 bls. rags; E. J. Keller Co. Inc., Scanstates, ——, 59 bls. rags.

WILMINGTON IMPORTS

WEEK ENDING OCTOBER 7, 1933

National Vulcanized Fibre Co., Navemar, Barcelona, 69 bls. rags; Castle & Overton, Inc., City of Fairbury, Wiborg, 2564 bls. wood pulp, 312 tons.

NEWPORT NEWS IMPORTS

WEEK ENDING OCTOBER 7, 1933

Bulkley Dunton & Co., Kelkheim, ——, 9620 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING OCTOBER 7, 1933

Tupman Thurlow Inc., Bonneville, B. Ayres, 1667 bags casein; International Purchasing Co., Black Heron, Rotterdam, 51 coils old rope; Castle & Overton, Inc., Black Heron, Rotterdam, 700 bls. wood pulp, 140 tons; Congoleum-Nairn Co., Black Heron, Rotterdam, 263 bls. rags; Congoleum-Nairn Co., Schodack, Bordeaux, 296 bls. rags; Congoleum-Nairn Co., Schodack, St. Nazaire, 211 bls. rags; Congoleum-Nairn Co., Exiria, Marseilles, 797 bls.

(Continued on page 49)

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, October 11, 1933.

The position of the local paper market is practically unchanged. However, following the final approval of the Recovery Code for the Paper Industry, which is expected to take place within the next few days, trading should become more lively. Prices are generally steady and unchanged.

Sentiment in the news print paper market is improving. Advertising volume in the leading newspapers of the country is expanding. Production in the United States, Canada and Newfoundland is being maintained in sufficient volume to take care of current requirements. Stocks at the mills are not excessive.

The paper board market is fairly active. Box board operations are proceeding at near capacity. Board specialties are moving freely. The fine paper market is marking time awaiting the outcome of the Code. Tissues are going forward at a seasonal pace. The coarse paper market is holding up well.

Mechanical Pulp

Conditions in the ground wood pulp market are fairly satisfactory. Manufacturing operations both in this country and abroad are generally keyed to consumption and the industry is in a sound statistical position. The contract movement is normal. Recently advanced prices are well maintained.

Chemical Pulp

The chemical pulp market continues to exhibit a steady undertone, although demand for the various imported and domestic grades is rather light at present. Prices are generally holding to previously quoted levels, without difficulty, and reports of concessions are infrequent.

Old Rope and Bagging

Quietness prevails in the old rope market. Demand for foreign and domestic old manila rope is listless. Small mixed rope is moving slowly. Due to the strengthening of foreign currencies, the bagging market is firmer. Scrap and gunny bagging are in moderate request. Roofing bagging is dull.

Rags

The domestic rag market is showing some signs of improvement. Demand for new cotton rags is fairly persistent. No. 1 white shirt cuttings continue to display strength. Roofing rags are rather quiet. The imported rag market is practically unchanged and is still affected by foreign exchange fluctuations.

Waste Paper

Board mill demand for the lower grades of paper stock is slightly better. Strictly folded news and No. 1 mixed paper are steadier. Book stock is somewhat softer. Stitchless and overissue magazine are now both quoted at from $1.05 to $1.10. Hard and soft white shavings are moderately active.

Twine

The local twine market is marking time awaiting Code developments. Business transacted during the past week was mostly along routine lines. Demand for the various grades should be more active during the closing months of the year. Prices are generally holding to schedule.

IMPORTS OF PAPER STOCK

(Continued from page 48)

rags; National City Bank, Quaker City, Leith, 118 bls. bagging; ——, Quaker City, Leith, 48 bls. rags; ——, Quaker City, London, 183 bls. waste paper; ——, Quaker City, London, 182 coils old rope; G. A. Henshaw & Son, Coelleda, Manchester, 232 bls. waste paper; M. Sone, Carlsholm, Gothenburg, 300 bls. wood pulp; M. Sone, Luossa, Karlsborg, 2500 bls. wood pulp; Parsons & Whittemore, Inc., City of Hamburg, ——, 1000 bls. wood pulp; Gottesman & Co., Inc., Carlsholm, Sweden, 3450 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING OCTOBER 7, 1933

Champagne Paper Corp., Schodack, St. Nazaire, 400 cs. cigarette paper; ——, Quaker City, Dundee, 31 bls. rags.

CHARLESTON IMPORTS

WEEK ENDING OCTOBER 7, 1933

Darmstadt Scott & Courtney, Montreal City, Kobe, 400 bls. bagging.

HOUSTON IMPORTS

WEEK ENDING OCTOBER 7, 1933

Chase National Bank, Montreal Maru, Kobe, 400 bls. bagging.

Augusta Paper Mill Is Leased

[FROM OUR REGULAR CORRESPONDENT]

AUGUSTA, Me., October 5, 1933—Lease of the Cushnoc Paper Company of Augusta by the Seaboard Company of this city was signed today by all parties, and will be in effect until May of next year, it was announced.

The lease was so drawn that unless extremely adverse business conditions interrupt the paper making industry, the Augusta mill will be assured of orders for sufficient tonnage of newsprint to keep it in operation at its present rate of production.

Newsprint Gains in Canada

Production of newsprint in Canada from June through August was about 20 per cent in excess of that in the same period last year, according to S. H. Logan, general manager of the Canadian Bank of Commerce. He adds that, as a result of the gains, many idle plants were put back into operation.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 11, 1933.

BLANC FIXE.—Steadiness prevails in the blanc fixe market. Prices are generally holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—The position of the bleaching powder market is practically unchanged. Demand is rather quiet at present, although contract shipments are moving regularly. Bleaching powder is quoted at from $1.75 to $2 per 100 pounds, in drums, at works.

CASEIN.—The casein market continues dull. Domestic standard ground is quoted at 14 cents and finely ground at 15 cents per pound. Argentine standard ground is selling at 14 cents and finely ground at 14½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Demand for caustic soda is fairly persistent. Prices remain steady and unaltered. Solid caustic soda is quoted at from $2.55 to $3.00; while the flake and the ground are selling at from $2.95 to $3.00 per 100 pounds, in large drums, at works.

CHINA CLAY.—The china clay market is marking time. Contract shipments are moving in good volume. Imported china clay is still quoted at from $12 to $17 per ton, ship side; while domestic paper making clay is selling at from $4.50 to $12 per ton, at mine.

CHLORINE.—Conditions in the chlorine market are satisfactory. The contract movement is normal. Prices are holding to schedule, without difficulty. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multiunit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is easier than of late. The grades of gum rosin used in the paper mills are quoted at $5.00 per 280 pounds, in barrels, at works; while wood rosin is selling at $4.00 per 280 pounds, in barrels, at southern shipping points.

SALT CAKE.—Trading in the salt cake market is fairly active. Prices remain unchanged. Salt cake is quoted at from $14 to $14.50; chrome salt cake at from $13.50 to $14 per ton, at works; while imported salt cake is selling at from $14 to $14.50 per ton, on dock.

SODA ASH.—The soda ash market is exhibiting a strong undertone. Shipments against contract are moving at a steady pace. Prices are firm. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.30; and in barrels, $1.43.

STARCH.—No further changes were reported in the starch market. The contract movement is normal. Prices remain unaltered. Special paper making starch is quoted at $2.82 per 100 pounds, in bags; and at $3.09 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Paper mill demand for sulphate of alumina is fairly persistent. Prices are steady and unchanged. Commercial grades are quoted at from $1.25 to $1.46; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market continues firm. Sulphur is quoted at $18 per long ton, on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Business in the talc market is moderately active. Prices are holding to formerly quoted levels. Domestic talc is still quoted at from $16 to $18 per ton, in bulk, at eastern mines; while imported talc is selling at from $20 to $50 per ton, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	—
Bonds	6.00	@	—
Index	6.00	@	—
Writings—			
Extra Superfine	6.50	@	—
Superfine	6.25	@	—
Tub sized	5.75	@	—
Engine sized	5.50	@	—
Book, Cased—			
S. & S. C.	5.50	@	—
S. & S. C. Litho.	5.75	@	—
M. F.	5.25	@	—
Coated and Enamel	6.15	@	9.30
Coated Litho	6.90	@	—
Tissues—Per Ream—			
White No. 1	.60	@	.80
White No. 2	.55	@	.70
Anti-Tarnish M. G. only	.75	@	.80
Colored	.80	@	1.00
Kraft	.75	@	.80
Manila	.65	@	.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	3.37½	@	—
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.00	@	3.00
Card Middles	4.00	@	5.00
Glassine—			
Bleached, basis 25 lbs., No. 1	.11	@	—
No. 2	.10	@	—
Bleached, basis 20 lbs.	.13	@	—

(Delivered New York)

News, per ton—			
Roll, contract	40.00	@	—
Rolls, spot	40.00	@	—
Sheets	45.00	@	—
Side Runs	25.00	@	—
Kraft—			
No. 1 Domestic	4.75	@	5.00
No. 2 Domestic	3.62½	@	4.00
Southern	3.62½	@	4.00
Imported	Nominal		
Boards—per ton—			
News	45.00	@	50.00
Chip	42.50	@	47.50
Binders Boards	68.00	@	72.00
Kraft Liner	75.00	@	85.00
Standard 85 Test Jute Liner	50.00	@	55.00
Sgl. Mla. Ll. Chip	52.50	@	55.00

(F. o. b. Mill)

Wood Pulp Board	70.00	@	80.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	27.50	@	29.00
Dry	28.00	@	29.50

(F.o.b. Mill)

No. 1 Domestic and Canadian	24.00	@	28.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—			
Bleached	2.70	@	3.00
Easy Bleaching	2.10	@	2.20
No. 1 strong unbleached	1.90	@	2.00
Mitscherlich Unbleached	1.95	@	2.05
No. 2 Strong unbleached	1.75	@	1.85
No. 1 Kraft	1.75	@	1.85
No. 2 Kraft	1.60	@	1.70
Sulphate—			
Bleached	2.75	@	3.25

(F. o. b. Pulp Mill)

Sulphite (Domestic and Canadian)—			
Bleached	2.50	@	3.75
Easy Bleaching	1.90	@	2.05
News	1.85	@	1.95
Mitscherlich unbleached	2.25	@	2.50
Kraft (Domestic)	1.60	@	2.75
Soda Bleached	2.50	@	—

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.00
Silesias No. 1	4.25	@	4.50
New Unbleached	6.75	@	7.25
New Soft Blacks	3.00	@	3.25
Blue Overall	4.25	@	4.50
Fancy	2.50	@	2.75
Washables	2.00	@	2.25
Mixed Khaki Cuttings	3.25	@	3.50
O. D. Khaki Cuttings	4.00	@	4.25
Men's Corduroy	1.50	@	—
New Mixed Blacks	2.50	@	2.75

Old Rags

White, No. 1—			
Repacked	3.75	@	4.00
Miscellaneous	3.00	@	3.50
White, No. 2—			
Repacked	2.00	@	2.50
Miscellaneous	1.75	@	2.00
Thirds and Blues—			
Repacked	1.75	@	2.00
Miscellaneous	1.50	@	1.75
Black Stockings	2.50	@	3.00
Roofing Rags—			
No. 1	.90	@	.95
No. 2	.80	@	.85
No. 3	.75	@	.80
No. 4	.70	@	.75
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	1.50	@	1.60
New Mixed Cuttings	1.60	@	1.70
New Light Silesias	3.50	@	3.75
Light Flannelettes	3.25	@	3.50
Unbleached Cuttings	5.75	@	6.00
New White Cuttings	5.50	@	6.00
New Light Oxfords	3.25	@	3.50
New Light Prints	2.75	@	3.00

Old Rags

No. 1 White Linens	7.00	@	7.50
No. 2 White Linens	6.00	@	6.50
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	3.75	@	4.00
No. 2 White Cotton	3.00	@	3.25
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.50	@	1.60
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	1.65	@	1.80
French Blue Linens	2.10	@	2.25
German Blue Linens	1.85	@	2.00
German Blue Cottons	1.35	@	1.50
Checks and Blues	1.30	@	1.40
Lindsay Garments	1.10	@	1.15
Dark Cottons	1.00	@	1.10
Old Shopperies	.85	@	.90
New Shopperies	.80	@	.85
French Blues	1.50	@	1.65

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.30	@	1.40
Domestic	1.25	@	1.35
Wool Tares, light	1.05	@	1.15
Wool Tares, heavy	1.05	@	1.15
Bright Bagging	1.00	@	1.10
Manila Rope—			
Foreign	2.50	@	2.75
Domestic	2.50	@	2.75
Small Mixed Rope	1.10	@	1.35
New Burlap Cut	1.50	@	1.75
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.60	@	2.75
Ordinary Hard White No. 1	2.30	@	2.50
Hard White No. 2	2.20	@	2.30
Soft White No. 1	2.15	@	2.25
Flat Stock—			
Stitchless	1.05	@	1.10
Overissue Mag	1.05	@	1.10
Solid Flat Book	1.00	@	1.05
Crumpled No. 1	.85	@	.90
Solid Book Ledger	1.50	@	1.75
Ledger Stock	1.05	@	1.15
New B. B. Chips	.50	@	.60
Manilas—			
New Env. Cut	1.65	@	1.75
New Cuttings	1.20	@	1.25
Extra No. 1 old	.90	@	1.00
Print	Nominal		
Bogus Wrapper	.70	@	.80
Container	Nominal		
Old Kraft Machine—			
Compressed bales	1.15	@	1.25
News—			
No. 1 White News	1.20	@	1.30
Strictly Overissue	.75	@	.85
Strictly Folded	.70	@	.75
No. 1 Mixed Paper	.45	@	.50

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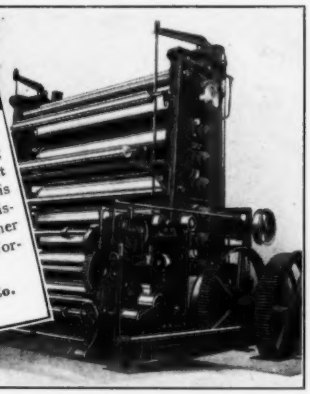

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Twines
(F. o. b. Mill)

Cotton—			
B. C. 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Finished Jute—			
Dark, 18 basis	.18	@	.20
Light 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.15½	@	.16½
No. 2	.15	@	.16
Tube Rope—			
4-ply and larger	.09¾	@	.11¾
Fine Tube Rope—			
4-ply	.13¼	@	.14¾
3-ply	.14¼	@	.14¾
2-ply	.15¼	@	.15¾
Paper Makers Twine	.08¾	@	.10¾
Box Twine, 2-3 ply	.12¾	@	.13½
White Hemp	.12¾	@	.15¾
Java Sisal—			
No. 1 Basis	.11½	@	—
No. 2 Basis	.10½	@	—
New Zealand Sisal	.11½	@	—
Sisal Lath Yarn—			
No. 1	.13½	@	.15½
No. 2	.11½	@	.13½
Manila Twine	.24½	@	.29½

CHICAGO

Paper
(F. o. b. Mill)

Rag Bond	.30	@	.53¼
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.04	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.07	@	.18
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¾	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	3.50	@	4.50
Southern Kraft	2.62½	@	—
No. 2 Kraft	2.62½	@	—
Wood Tag Boards	.04¾	@	.06¾
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.07	@	.07¾
White Tissue	.07¾	@	.07½

(Delivered Central Territory)

News, per ton—			
Rolls, contract	45.00	@	—
Sheets	50.00	@	—
Boards, per ton—			
Plain Chip	37.50	@	—
Solid News	43.50	@	—
Manila Lined Chip	47.50	@	—
Patent coated	55.00	@	—
Container Lined—			
85 Test	60.00	@	65.00
100 Test	60.00	@	70.00

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	1.70	@	1.80
No. 1 Hard White	1.40	@	1.50
No. 1 Soft White	1.20	@	1.30
Ledger & Writings	.80	@	.90
Solid Books	.80	@	.90
Blanks	1.00	@	1.05
Krafts	.90	@	1.00
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	1.00	@	1.05
Print Manila	.60	@	.65
Overissue News	.60	@	.70
Old Newspapers—			
No. 1	.55	@	.65
Mixed Papers—			
No. 1	.50	@	.55
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(F. o. b. Mill)

Bonds	.04	@	.40
Ledgers	.06	@	.40
Writings—			
Superfine	.10	@	.18
Extra Fine	.15	@	.26
Fine	.15	@	.26
Fine, No. 2	.10	@	.25
Fine No. 3	.05½	@	.18
Book, M. F.	.04¾	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.06	@	.16
Coated Lithograph	.06	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.06	@	.10
Manila Sul., No. 1	.03	@	.06
Manila No. 2	.03	@	.05
No. 1 Kraft	.05¼	@	.06½
No. 2 Kraft	.03¾	@	.05
Southern Kraft	2.75	@	4.00
Common Bogus	.03	@	.04½

(Delivered Philadelphia)

News Print Rolls	46.00	@	55.00
Straw Board	40.00	@	45.00
News Board	37.00	@	45.00
Chip Board	40.00	@	45.00
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.03½	@	.04
New White, No. 2	.02½	@	.04
Light Silesias	.02½	@	.03
Silesias, No. 1	.03	@	.03½
Black Silesias, soft	.02½	@	.03
New Unbleached	.05	@	.05½
Washable, No. 1	.01½	@	.02
Blue Overall	.03½	@	.04
Cottons—According to grades—			
Washable, No. 2	.02½	@	.03
New Blue	.01½	@	.03
Fancy	.01½	@	.03
New Black Soft	.02	@	.04
New Light Seconds	.01½	@	.02
New Dark Seconds	1.50	@	1.75
Khaki Cuttings—			
No. 1 O.D.	.03	@	.04
No. 2 Mixed	.03	@	.04
Corduroy	.02	@	.03
New Canvas	.03½	@	.04½
New Black Mixed	.02½	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	2.50	@	3.50
Miscellaneous	1.75	@	2.25
M. G.	3.00	@	3.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.50
Repacked	1.50	@	2.00
Black Stockings (Export)	2.00	@	3.50
Roofing Stock—			
Foreign No. 1	.50	@	.75
Repacked	.70	@	.85

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.50
Domestic	1.50	@	1.75
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.50
No. 2	.80	@	1.00
Wool Tares, heavy	2.75	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.40
No. 2 Hard White	2.10	@	2.15
No. 1 Soft White	2.15	@	2.20
No. 2 Soft White	1.15	@	1.25
No. 1 Mixed	.95	@	1.00
No. 2 Mixed	.75	@	.80
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.15	@	1.20
No. 1 Books, heavy	1.00	@	1.10
No. 2 Books, light	.75	@	.85
No. 1 New Manila	1.20	@	1.50
No. 1 Old Manila	.95	@	1.00
Print Manila	.85	@	.90
Container Manila	.80	@	.85
Old Kraft	.90	@	1.05
Common Paper	.40	@	.45
No. 1 Mixed Paper	.50	@	.55
Straw Board Chip	.50	@	.55
Binders Board Chip	.50	@	.55
Corrugated Board	.75	@	.80
Overissue News	.65	@	.70
Old Newspapers	.60	@	.65

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.05½	@	.11
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¾
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	—
No. 2 Kraft	.03½	@	—

(F. o. b. Boston)

Southern Kraft	.03½	@	—

(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)

Common Bogus	.02	@	.02¾

(Delivered New England points)

News Print, rolls	44.50	@	—
Straw Board, rolls	.009	@	35.00
Straw Board in Sheets, basis 35s to 70s	—	@	40.00
Filled News Board	45.00	@	50.00
Chip Board	42.50	@	47.00
Chip Board (Creasing)	45.00	@	—
Single Manila Lined Chip	52.50	@	62.50
Single White, Patent Coated News Board—Bender	62.50	@	72.50
Wood Pulp Board	70.00	@	75.00
Binder Boards	62.00	@	75.00

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	—	@	2.50
No. 1 Soft White	—	@	2.25
No. 1 Mixed	.90	@	1.00
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	1.00	@	1.10
No. 1 Books, heavy	1.10	@	1.20
No. 1 Books, light	.80	@	1.00
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.25	@	1.30
No. 1 Old Manila	.95	@	1.05
White Blank News	1.20	@	1.30
No. 1 Kraft	1.10	@	1.15
Manila	.90	@	1.05
No. 1 Mixed Papers	—	@	.37½
Print Manila	.75	@	.80
Overissue News	.80	@	.90
Old Newspapers	.62½	@	.65
Box Board Chips	.45	@	.50
Corrugated Boxes	—	@	.40
Screening wrappers	.75	@	.85

Bagging
(F. o. b. Boston)

Manila Rope—			
Foreign	—	@	2.25
Domestic	—	@	2.50
Transmission Rope	1.50	@	—
Mixed Strings	.65	@	.75
Jute Rope	1.00	@	1.15
Jute Carpet Threads	.65	@	.70
Gunny No. 1—			
Foreign	1.25	@	1.30
Domestic	—	@	1.00
Bleachery Burlap	3.00	@	3.25
Scrap Burlap	—	@	1.00
No. 1 Scrap Burlap	1.20	@	1.25
Scrap Sisal	1.10	@	1.15
Scrap Sisal for shredding	1.15	@	1.30
Wool Tares, heavy	1.15	@	1.25
New Burlap Cuttings	1.15	@	1.25
Australian Wool Pouches	2.50	@	—
Heavy Baling Bagging	1.60	@	1.85
Paper Mill Bagging	.85	@	.95
Bagging No. 2	.50	@	.60
No. 1 Burlap	1.75	@	2.25

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.02	@	.02¼
New White No. 1	.05½	@	.06
New White No. 2	.04½	@	.05
Silesias No. 1	.04	@	—
New Black Silesias	.02½	@	.03
New Unbleached	—	@	.05½
Blue Cheviot	—	@	4.65
Fancy	—	@	.02¼
Washable	.02¼	@	—
Cottons—According to grades—			
Blue Overalls	—	@	.03¼
New Black, soft	.04	@	.04½
Khaki Cuttings	.03	@	.03¼
O. D. Khaki	.03	@	.03¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	.05	@	.05½

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.00	@	—
White No. 2—			
Repacked	.01¼	@	.01¾
Miscellaneous	.01½	@	.01¾
Twos and Blues	1.25	@	1.50
Thirds and Blues			
Repacked	1.10	@	1.25
Miscellaneous	.85	@	.90
Black Stockings	2.25	@	2.50
Roofing Stock—			
No. 1	—	@	.50
No. 2	.55	@	.65
No. 3	.35	@	.45

Foreign Rags
(F. o. b. Boston)

Dark Cottons	.95	@	—
New White Shirt Cuttings	5.50	@	6.50
Dutch Blues	2.00	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.55	@	1.60
Old Linsey Garments	1.35	@	—

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.09¾	@	—
No. 2 Sulphite	.08	@	—
No. 1 Colored	.10¼	@	—
No. 2 Colored	.08½	@	.10½
Ledgers (sulphite)			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.20	@	—
No. 3 M. F. (Carloads)	5.70	@	—
No. 4 M. F. (carloads)	4.75	@	—
No. 1 S. C. (carloads)	6.65	@	—
No. 3 S. C. (carloads)	6.20	@	—
No. 4 S. C. (carloads)	5.20	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.25	@	—
White Wrap	2.00	@	—
"B" Manila	4.75	@	—
No. 1 Manila	5.25	@	—
Fiber	5.25	@	—
Kraft, M. F.	5.75	@	—
Kraft No. 2	5.35	@	—
News, per ton—			
Rolls (contract)	45.50	@	—
Sheets	50.50	@	—

Pulp
(F. o. b. Mill)

Ground Wood	18.00	@	20.00
Sulphite easy bleaching	40.00	@	—
Sulphite, news grade	38.00	@	—
Sulphite, bleached	50.00	@	55.00
Sulphate	50.00	@	—

Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.10
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.50
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.50
Printed Manilas	.55	@	.80
Kraft	1.25	@	1.50
News and Scrap—			
Strictly Overissue	1.00	@	—
Strictly Folded	.85	@	—
No. 1 Mixed Paper	.70	@	—

Domestic Rags
(Price to mills f. o. b. Toronto)

No. 1 White Shirt Cuttings	.05½	@	.05½
Fancy Shirt Cuttings	.02¼	@	.03½